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THE CHEMISTRY OF INNER ROOT SHEATH AND HAIR KERATINS.

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It is well recognized that the term "keratin" does not signify a single chemical compound. There are many types of keratin, and some of these have obvious physical differences such as hair, nails, and horn. Moreover it is known that keratin from a given source is not necessarily constant in its chemical composition (Rothman, 1954). These alterations in its constitution depend on several factors that operate during the process of keratinization. Thus the rate of keratinization, mechanical friction, irradiation, and changes in the state of the underlying dermis may all influence the structure and composition of the keratin produced. The dynamics of keratinization are therefore complex, and its study requires examination not only of the keratin itself but of the cells that are becoming keratinized, and also of the underlying dermis.

We have employed two techniques to study this problem. First, the various keratins have been examined by fluorescence microscopy, and second, the differences thus brought to light have been further investigated by means of enzymes and chemicals. This paper deals with our findings regarding differences in chemical constitution between inner root sheath, and hair keratins.

MATERIAL AND METHODS.

Enzyme Studies.

Paraffin sections of human scalp fixed in 70% alcohol were taken to distilled water and fluorochromed with a 0·1% aqueous solution of thioflavine T for

3 minutes. They were dehydrated rapidly in 98% alcohol and absolute alcohol, and then placed in xylol before being finally mounted in Gurr's DePeX. These preparations were examined by fluorescence microscopy as described by Jarrett *et al.* (1956).

With this method epidermal and hair keratins fluoresce blue; inner root sheath keratin is a brilliant yellow (Fig. 1). The cell nuclei also fluoresce a bright yellow, and because of this similarity to inner root sheath keratin it was thought possible that this keratin might contain nucleic acids that are absent in normal epidermal and hair keratins.

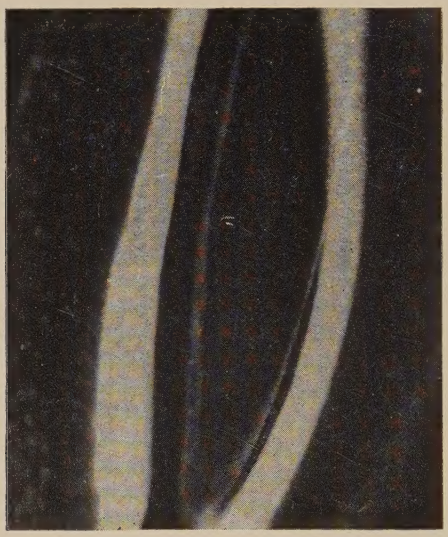

FIG. 1.—Normal inner root sheath. Thioflavine T. Brilliant yellow fluorescence of root sheath keratin; hair blue. (A colour photomicrograph of this fluorescence has been published. *Brit. J. Derm.* (1956) **68**, 111.)

To investigate this possibility, sections were incubated in ribonuclease (RNase) after short alkaline hydrolysis. They were hydrolysed in 1% solution of potassium hydroxide for 1 minute. After this they were incubated at 37° C for 1 hour in a 0·04% aqueous solution of ribonuclease buffered to pH 6·5 with phosphate buffer. Control sections were hydrolysed, and incubated for 1 hour in water buffered to the same pH. The sections were washed in distilled water, and fluorochromed with thioflavine T as previously described.

It was found that the yellow fluorescence of the inner root sheath was considerably reduced in the sections treated with RNase whereas in the control sections the inner root sheaths still fluoresced a brilliant yellow.

This experiment was repeated with double the concentration of RNase, but without previous hydrolysis. This concentration of RNase abolished the

yellow fluorescence of the root sheaths without the need of hydrolysis. In the control sections the yellow fluorescence remained.

In all these experiments the epidermal and hair keratins fluoresced blue both in the RNase-treated sections and in the controls.

Visible light microscopy.—The Unna-Pappenheim staining technique colours the inner root sheath a deep reddish-purple ; the epidermal and hair keratins are very pale purple. After RNase digestion (0·08% for 1 hour at pH 6·5) the red colour of the root sheaths is considerably reduced. Control sections incubated in water buffered to the same pH and subsequently stained showed the usual staining of the root sheaths.

Chrysoidin in a concentration of 0·5% in aqueous solution selectively stains the inner root sheaths orange. Sections were stained for 10 minutes after having been incubated in RNase in the concentration previously mentioned. The inner root sheaths then stained only very weakly, but in the water controls they stained deep orange.

Deoxyribonuclease (DNase) Studies.

Sections of normal scalp were hydrolysed as in the RNase series, and then incubated for 1 hour in a 0·001% solution of DNase buffered to pH 6·5. Control sections were incubated in water buffered to the same pH. The sections were then fluorochromed as in the previous experiments. Although the nuclear fluorescence of the epidermal cells was abolished, except for the nucleoli which contain RNA, no change was observed in the degree of yellow fluorescence of the inner root sheaths. This experiment was repeated several times with and without previous hydrolysis, but no reduction in the root sheath fluorescence occurred. These observations indicate that there is little, if any, deoxyribonuclear protein in inner root sheath keratin.

Treatment of sections with *both* RNase and DNase in the concentrations already mentioned completely abolished all the yellow fluorescence of the nuclei and of the inner root sheaths when these sections were subsequently fluorochromed with thioflavine T. This shows that thioflavine T specifically fluoresces with nucleic acids, and that this fluorochrome can therefore be used to locate nucleic acids in tissues.

The results obtained with these specific enzymes may be taken as evidence that ribonuclear protein is present in inner root sheath keratin, but deoxyribonuclear protein is either absent, or is present in only very small amounts. In support of this finding the presence of RNA in the peripheral sheath cells of chick embryo follicles has been demonstrated by toluidine staining ; the staining was removed by ribonuclease digestion (Koning, 1957).

Effects of RNase on the Molecular Orientation of Inner Root Sheath Keratin.

There is good molecular orientation in inner root sheath keratin as shown by strong birefringence when examined by polarized light (Fig. 2). The optical anisotropy is not so marked as that of hair keratin, but is more than that occurring in epidermal keratin.

After treatment with RNase (0·08% for 1 hour) the birefringence of the inner root sheaths was greatly reduced, but the molecular orientation of hair and epidermal keratin was not affected (Fig. 3).

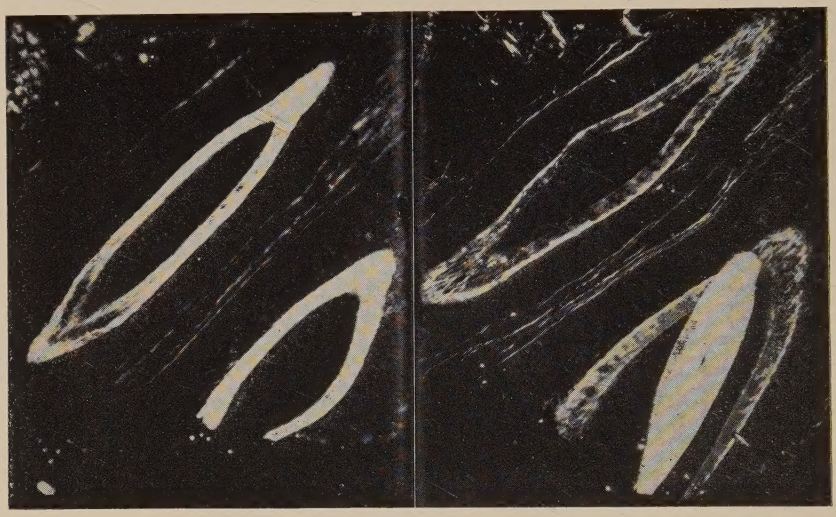

Fig. 2.—Normal inner root sheath. Marked birefringence of inner root sheath keratin. Polariscopic microscopy.

Fig. 3.—Inner root sheath and hair treated with RNase. (Same tissue as Fig. 2, adjacent serial section.) There is marked diminution of the birefringence of the inner root sheath. The hair has not been affected. Polariscopic microscopy.

This is further evidence of the profound effect of this enzyme on inner root sheath keratin. The disorientation of the molecules following the use of RNase suggests that ribonuclear protein is an integral part of the keratin structure. When this protein is removed the molecular arrangement is destroyed, and the keratin is much less birefringent.

Effects of Peracetic Acid on the Molecular Orientation of Inner Root Sheath and Hair Keratins.

The oxidation of hairs with peracetic acid had no effect on the molecular orientation when examined by polariscopic microscopy. This shows that oxidation of the S-S linkages alone does not cause a molecular disorientation of the keratin. Neither was there any change of orientation of the inner root sheath

keratin ; this finding was to be expected in view of the experiments reported later in which it was shown that this acid did not oxidize root sheath keratin because of its ribonuclear protein content.

Effects of Trypsin on Hair and Inner Root Sheath Keratins.

Sections of normal skin were taken to water as in the previous series. These were then subjected to tryptic digestion by solutions of trypsin of various strengths. The concentrations used were 0·04%, 0·02%, 0·008%, and 0·004% aqueous solutions buffered to pH 7·5 with phosphate buffer. Controls were set up in water buffered to the same pH. The sections were incubated at 37° C for $\frac{1}{4}$ hour, rapidly rinsed in distilled water, and then fluorochromed with thioflavine T.

In all concentrations of trypsin the epidermis was completely removed at the dermo-epidermal junction. In the two highest concentrations the cells of the outer root sheaths were also digested and consequently the inner root sheaths and their hairs fell out of the sections. At the two lower concentrations, however, the hairs and their root sheaths remained. There was no evidence of tryptic activity on either of these two keratins ; the hairs fluoresced blue and the root sheaths were a brilliant yellow, and there was no evidence of anatomical disruption of these structures. These results are in agreement with previously recorded findings that intact keratins are resistant to proteolytic enzymes.

Chemical and Physical Oxidation and Reduction of Inner Root Sheath and Hair Keratins.

Normally hair keratin, like epidermal keratin, fluoresces blue after fluorochroming with thioflavine T. Peracetic acid oxidizes cystine to cysteic acid, and therefore breaks down the S-S cross linkages that bind adjacent polypeptide chains in the keratin molecule. The effects of this oxidation are clearly demonstrated by fluorochroming hairs after treatment with peracetic acid. By this technique, differences were found between the action of this acid on hair and inner root sheath keratins.

Sections were taken to water as in the enzyme series. They were placed in a 3% aqueous solution of peracetic acid for 15 minutes, washed thoroughly in distilled water (pH 6·7), and then fluorochromed with thioflavine T. Control sections were immersed in water buffered to pH 6·5 for 15 minutes, and then treated in the same manner as the oxidized sections.

After treatment with peracetic acid, the inner root sheaths and the hairs both fluoresced a brilliant yellow (Fig. 4). This yellow fluorescence of the hairs cannot be due to nucleic acids, but must be the result of combination between the products of oxidation and the fluorochrome. To investigate this, sections treated with peracetic acid were subjected to subsequent ribonuclease digestion

and then fluorochromed with thioflavine T. This enzymic digestion after peracetic oxidation showed clear differences between hair and root sheath keratins. The inner root sheaths fluoresced blue, as is usual after RNase digestion, but the hairs continued to fluoresce a brilliant yellow (Fig. 5). This confirmed our belief that the yellow fluorescence of the hairs was not due to nucleic acids. It also showed that the peracetic acid had failed to oxidize the inner root sheath keratin ; for, had oxidation occurred, the yellow fluorescence would not have been abolished by ribonuclease.

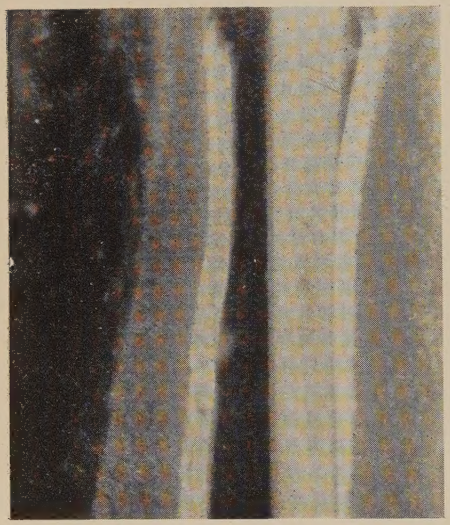

FIG. 4.—Peracetic acid treated inner root sheath. Thioflavine T. The hair and the inner root sheath both fluoresce bright yellow.

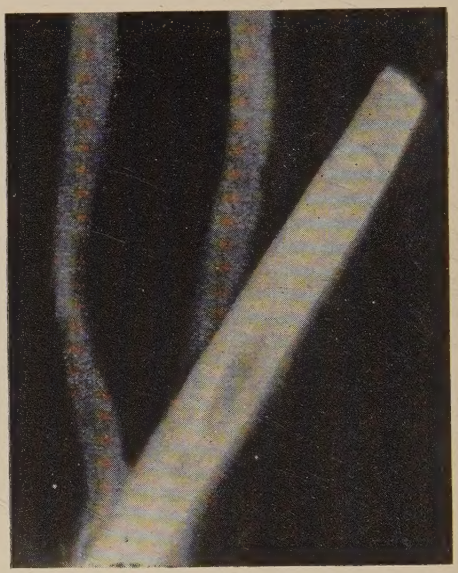

FIG. 5.—Peracetic acid treated inner root sheath followed by RNase digestion. Thioflavine T. The hair has remained yellow, but the inner root sheath has become blue. This difference in colour is shown by the much brighter fluorescence of the yellow hair compared with the dull blue fluorescence of the inner root sheath.

This failure to oxidize the inner root sheath keratin may have been due to its ribonucleic acid content. This was investigated by attempting to remove all the ribonuclear proteins by prolonged incubation with 0·08% RNase. Six sections were taken to water, three as controls and three for RNase digestion. The latter were incubated at 37° C in two changes of RNase for 48 hours. The control sections were incubated in water at pH 6·5 for the same time. One section from the RNase group, and one from the control group, were then fluorochromed with thioflavine T. The RNase-treated section showed complete absence of yellow fluorescence in the inner root sheaths, whereas in the control they were brilliant yellow. The remaining four sections from both groups were

then subjected to peracetic oxidation ; and then one from each group was fluorochromed with thioflavine T. In both the RNase-treated and in the control section, the hairs and the inner root sheaths then fluoresced a brilliant yellow.

The two remaining sections, one control and one RNase-treated, were then incubated with 0·08% RNase for 1 hour, and fluorochromed with thioflavine

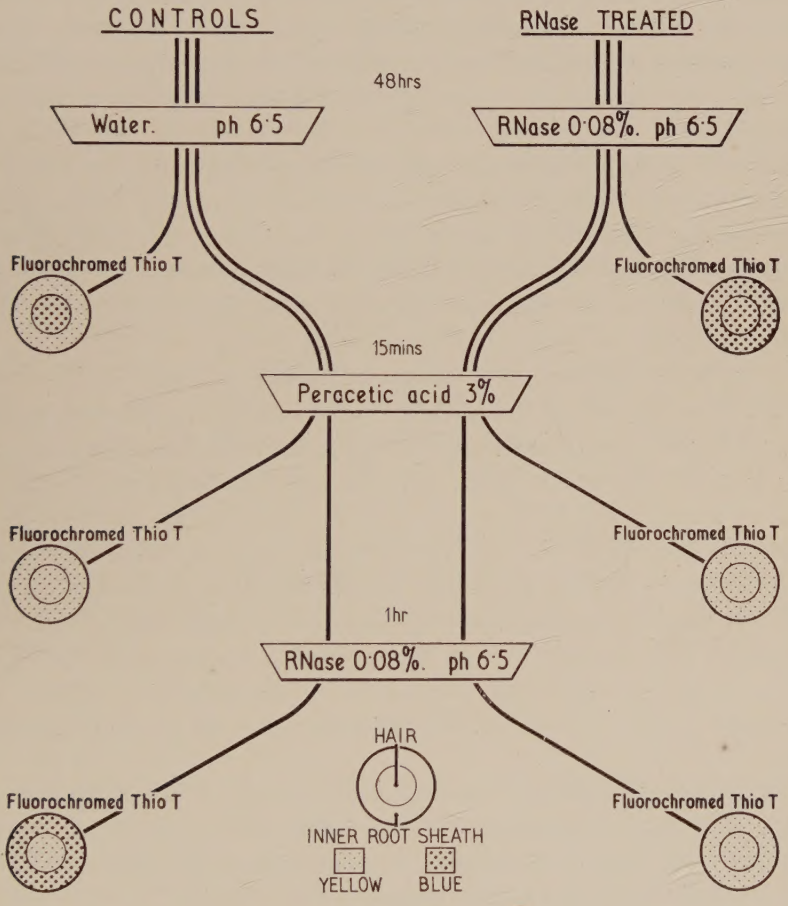

CHART 1.

T. The inner root sheaths of the control section then fluoresced blue, but that which had been subjected to previous prolonged RNase digestion remained a bright yellow, indicating that this root sheath keratin had been successfully oxidized by the peracetic acid.

We therefore concluded that inner root sheath keratin from which the ribonuclear proteins had been removed was susceptible to peracetic oxidation, whereas normal root sheath keratin was not. These results are shown schematically in Chart 1.

Reduction with Thioglycollic Acid.

Reduction of the cystine cross linkages was attempted with thioglycollic acid employed as a 25% aqueous solution. Sections were immersed in this solution for 2 minutes (longer immersion causes the sections to come away from the slides) washed in distilled water at pH 6·0 and then fluorochromed with thioflavine T. Control sections were placed in water at room temperature buffered to pH 2·5, and then washed and fluorochromed. There was a reduction of the fluorescence of the inner root sheaths of the sections treated with thioglycollic acid, but this was not significantly different from those immersed in water at pH 2·5.

Magdala red causes the inner root sheaths to fluoresce a greenish-yellow. This fluorescence is somewhat *intensified* to an orange colour after RNase digestion. This fluorochrome was chosen as there was no reduction in the intensity of root sheath fluorescence following RNase treatment, and therefore any reduction of the fluorescence on subsequent treatment with thioglycollic acid could be detected.

Sections were treated with 25% thioglycollic acid, with and without previous prolonged RNase digestion. In neither of these series was there any appreciable fluorescence change with magdala red in the inner root sheath or hair keratins. We were therefore unable to detect any effect of this chemical on hairs or root sheaths.

Calcium thioglycollate was also employed in a 1% aqueous solution. This solution was very alkaline (pH 11); the pH was therefore adjusted to 7 by the addition of thioglycollic acid. Sections were immersed in this mixture for 15 minutes and control sections were placed in water buffered to the same pH. After fluorochroming with thioflavine T and acridine orange, no significant change in the fluorescence of either the hairs or the root sheaths was detected.

Calcium thioglycollate (1%) when employed at pH 11 for 2 minutes caused some alteration of hair keratin. The hairs fluoresced yellow, but there was little effect on the inner root sheaths. Control sections in water at pH 11 did not show any alteration of the hair fluorescence.

Reduction of mouse hairs with this solution has already been shown to have a marked effect on their fluorescence with acridine orange (Jarrett and Spearman, 1957).

Ultra-violet Irradiation.

Sections immersed in water buffered to pH 6·5 were exposed to ultra-violet rays for 90 minutes. A low pressure mercury vapour lamp of 150 watts was used as the source of irradiation. Control sections were placed in water buffered

to the same pH and heated to 37° C for the same period. The sections were then fluorochromed with thioflavine T and examined by fluorescence microscopy.

The inner root sheaths of the irradiated sections fluoresced blue, but those of the controls were a bright yellow. The hairs and epidermal keratin in both the irradiated and control sections were blue.

A second series of experiments was then performed to detect whether oxidation occurred either in the root sheaths or in the hairs of irradiated sections subsequently treated with peracetic acid.

Irradiated sections were prepared as before ; these were then treated with 3% peracetic acid at room temperature for 15 minutes. After fluorochroming with thioflavine T the hairs fluoresced a bright yellow showing that they had been oxidized, but the inner root sheaths remained blue. It appeared therefore that the hair keratin had been little affected by irradiation, as its fluorescence was not altered, and subsequent oxidation with peracetic acid gave the usual change of fluorescence. The root sheath keratin, however, was clearly altered, because its fluorescence changed, after irradiation, from yellow to blue.

On increasing the exposure to ultra-violet rays to $2\frac{1}{2}$ hours, the inner root sheaths became grossly altered ; the keratin ring was disrupted with fragmentation of the remaining keratin. The hairs still appeared unaltered by this drastic treatment. This greater sensitivity to ultra-violet irradiation of the inner root sheath keratin is a further point of distinction between this keratin and that of hair. With this prolonged exposure it was noted that the epidermal keratin was also anatomically grossly altered ; there were however no fluorescence changes.

Discussion.

From the experiments reported, it is certain that RNase has a profound effect on inner root sheath keratin (IRSK). The most likely explanation of this is that IRSK contains ribonuclear protein that is absent in normal hair and epidermal keratins. It appears that this nuclear protein is intimately bound to the keratin molecule. The inner root sheaths are more resistant to peracetic acid oxidation than normal hairs. If, however, the ribonuclear proteins are removed by prolonged digestion with RNase, then peracetic acid can oxidize IRSK producing a yellow fluorescence with the thioflavine T. This fluorescence is not removed by a second treatment with RNase, and therefore cannot be due to nuclear protein, but must be the result of successful oxidation.

It is known that peracetic acid attacks the S-S cross linkages (Alexander and Hudson, 1954), and it appears that this attack is prevented when ribonuclear protein is present in the keratin molecule. It is therefore possible that these nuclear proteins are bound to the S-S cross linkages of the keratin molecule

of inner root sheaths. The absence of nuclear protein in hair allows the easy oxidation of this keratin with peracetic acid.

Moreover the disorientation of the molecular arrangement of IRSK following digestion with RNase indicates that the ribonuclear protein is an integral part of the keratin molecule.

Other evidence for the association of nuclear protein with the S-S linkages in IRSK comes from the study of the effects of ultra-violet irradiation. Ultra-violet rays affect wool by disruption of the disulphide bond, and eventually all the cystine is removed. This effect is increased by the presence of water (Alexander and Hudson, 1954). The first stage of the reaction is thought to be activation of the disulphide bond due to the formation of ions. The ionized sulphur then reacts with water to form sulphenic acid and cysteine.

In the present work it has been shown that ultra-violet rays cause the IRSK to lose its yellow fluorescence when treated with thioflavine T. It is possible that this disruption of the S-S bonds allows the nuclear protein to be freed, and consequently the keratin no longer fluoresces when fluorochromed with thioflavine T. After prolonged irradiation, these disulphide linkages were so destroyed that subsequent oxidation with peracetic acid failed.

The action of RNase on IRSK is not thought to be due to proteolytic contamination of this enzyme. It was shown that trypsin in a concentration of 0·004% had no effect on IRSK. Stronger solutions caused the loss of the inner root sheaths from sections because the outer root sheaths were destroyed.

No effect was demonstrated with thioglycollic acid on either hair or IRSK. This acid reduces the disulphide linkages with the formation of sulphydryl groups ; this can be reversed with oxidizing agents. It is therefore thought that this chemical does not sufficiently alter the keratin molecule to allow detection by the fluorochromes employed, nor does there appear to be any loss of nuclear protein from IRSK after this type of reduction.

Hair keratin is however altered by calcium thioglycollate at pH 11. The blue fluorescence with thioflavine T is changed to pale yellow. It is possible that the keratin molecule has been " opened up " and the changed fluorescence is due to the better penetration of the fluorochrome.

It is reasonably certain that the yellow fluorescence of root sheath keratin in normal skin is due to the presence of ribonuclear protein. Nevertheless keratins may be made to fluoresce yellow for two other reasons : Products of oxidation such as are engendered by peracetic acid treatment give a yellow fluorescence with thioflavine T, also any chemical that " opens up " the molecule and allows penetration of the fluorochrome with consequent linkage may result in a yellow fluorescence.

It is important to note that in *untreated sections* there appears to be only one cause of yellow fluorescence of keratin, and that is its content of ribonuclear protein.

Ultra-violet Absorption Measurements on the Inner Root Sheath.

Dr. R. J. King of the Chester Beatty Research Institute kindly examined fixed sections of skin containing inner root sheath keratin by ultra-violet microscopy.

The ultra-violet absorption of keratin at wavelengths above 250 mμ would be mainly due to its tyrosine and tryptophane content ; these would give an optical density ratio at wavelengths 257 mμ and 275 mμ (D257/D275) of approximately 0·5. As the structure of the root sheath keratin is not accurately known, it is not possible to assign a definite figure to this ratio, and the position may be further complicated by molecular orientation effects (see below). Ribonucleic acid, on the other hand, has an optical density ratio D257/D275 of approximately 1·5, and its absorption in this particular region is very much greater than that of an equal concentration of protein.

Microspectroscopic measurements could be made to only a limited accuracy as the inner root sheath is not uniform in absorption over its whole surface. Absorption measurements from several sections and on various regions of the inner root sheath gave density ratios D257/D275 between 0·57 and 0·7. At 313 mμ, the absorption of root sheath keratin was very low, and therefore measurements made at shorter wavelengths should not suffer from large errors due to scatter effects.

It is therefore clear that the ultra-violet absorption of the inner root sheath is mainly due to protein, and if any RNA is present it must be in low concentration (i.e. not more than 1 or 2% of the total protein). It is not possible to draw any more definite conclusions from these direct measurements.

Effects of Ribonuclease.

Digestion of IRSK with a 0·08% solution of RNase for 1 hour at 37° C resulted in an *increase* in absorption, the optical densities being about 2 to 2·5 times their original values. The ratio D257/D275 was not significantly affected and there was still no appreciable absorption at 313 mμ.

There was an interesting structural alteration as a result of RNase digestion. Untreated root sheath keratin shows remnants of cellular structure when examined by ultra-violet microscopy (Fig. 6). After treatment with RNase the structure swells slightly, appears more homogeneous, and exhibits stronger absorption (Fig. 7). If RNase digestion had only removed ribonucleic acid, a decrease in absorption would have been expected. It is clear that any decrease due to this effect has been masked by the gross increase in absorption resulting from structural changes of the keratin.

Effects of Ultra-violet Irradiation.

Heavy ultra-violet irradiation (275 mμ : 10^8 ergs/sq. cm.) of the RNase-treated root sheath resulted in a further increase in absorption. This was not

restricted to the shorter wavelengths (i.e. below 300 mμ) as in the case of RNase digestion alone ; in fact the increase in optical density became progressively larger at the longer wavelengths. Typical values recorded were 0·07 at 257 mμ, 0·12 at 275 mμ and 0·27 at 313 mμ.

In contrast, this dose of irradiation produced no change in the absorption of sections that had not been treated with RNase. If the irradiated root sheath was then digested with RNase, the absorption changes were similar to those from a region having no prior irradiation.

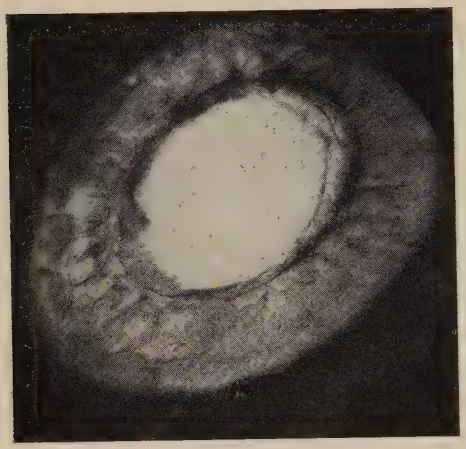

Fig. 6.—Normal inner root sheath. Ultra-violet microscopy × 660.

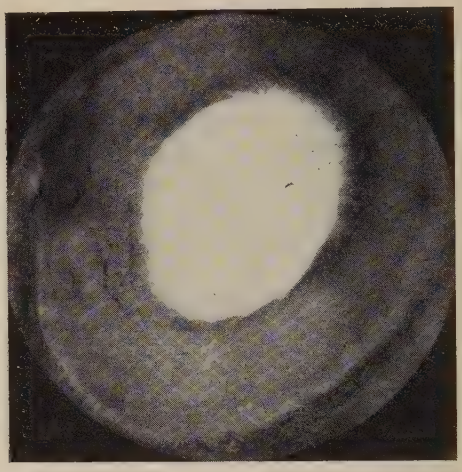

Fig. 7.—RNase-treated inner root sheath. Ultra-violet microscopy.

Effects of Trypsin Digestion.

No alteration in the absorption or structure of root sheath keratin was observed after digestion for 15 minutes with 0·008% trypsin solution. This confirms the previous findings with fluorescence microscopy.

Discussion.

From these results it is clear that RNase has a considerable effect on root sheath keratin. It is unlikely that this effect is due to proteolytic contamination of the ribonuclease, as tryptic digestion failed to produce any change.

Concerning the irradiation effects, it is interesting to note that McLean and Giese (1950) found an increase in absorption of solutions of egg albumin, and of aromatic amino acids, following ultra-violet irradiation. This increase occurred over a whole range of wavelengths to above 300 mμ, and was thought to be the result of oxidation processes. With the inner root sheath keratin, previous RNase digestion greatly accentuates the changes caused by ultra-

violet irradiation. This is a true effect of increased sensitivity, and is not simply due to the greater amount of energy absorbed by the root sheath after RNase treatment. A further point of interest is that the effects of irradiation on the RNase-treated root sheath were more pronounced in sections mounted in water than in those immersed in glycerol.

These findings are consistent with the hypothesis that inner root sheath keratin has a small amount of ribonucleic acid fairly firmly bound to the keratin molecule. After RNase treatment the protein is free to become less orientated ; this results in an increase in absorption and also renders the keratin more susceptible to the effects of ultra-violet irradiation.

Summary.

The effects of enzymes and chemicals on normal inner root sheaths, hairs, and epidermal keratins have been studied by fluorescence microscopy, polaroscopy and ultra-violet absorption studies.

Ribonuclease has a profound effect on inner root sheath keratin of normal human skin. It is thought that this indicates the presence of ribonuclear protein within the keratin molecule. Normal hair and epidermal keratins do not appear to contain nuclear proteins, and they fluoresce a different colour from inner root sheath keratin when fluorochromed with thioflavine T.

Minimal ultra-violet irradiation also markedly affects the inner root sheaths, and differentiates this keratin from normal hair and epidermal keratins.

Deoxyribonuclease, trypsin, and thioglycollic acid had no effect on inner root sheath keratin when examined by the methods described.

The significance of the findings is discussed. It is thought that the ribonuclear proteins in root sheath keratin may be bound to the disulphide linkages of the keratin molecule.

Ultra-violet absorption measurements were made by Dr. R. J. King on the inner root sheath keratin. There was evidence that a small amount of ribonuclear protein is present in this keratin, and is probably closely bound to the molecule. Confirmation of the considerable effects of ribonuclease on root sheath keratin was also obtained by this method.

References.

Alexander, P. and Hudson, R. F. (1954) *Wool : its Chemistry and Physics.* London : Chapman & Hall.

Jarrett, A., Bligh, A. and Hardy, J. A. (1956) *Brit. J. Derm.*, **68**, 111.

——— and Spearman, R. I. (1957) *J. Embryol. exp. Morph.*, **5**, 103.

Koning, A. L. (1957) *Amer. J. Anat.*, **100**, 17.

McLean; D. J. and Giese, A. C. (1950) *J. biol. Chem.*, **187**, 537.

Rothman, S. (1954) *Physiology and Biochemistry of the Skin.* Chicago : University of Chicago Press, p. 349.

I am most grateful to Dr. W. N. Goldsmith for his helpful criticism. I also thank Mrs. J. Hardy and Dr. R. Spearman for their suggestions and valuable assistance.

I am indebted to Mr. A. Bligh for the photofluoromicrographs.

NON-SPECIFIC CHOLINESTERASE IN SPECIALIZED SENSORY NERVE-ENDINGS OF HUMAN GENITAL SKIN.

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The enzyme *non-specific* (pseudo-, butyro-) cholinesterase (ChE) has recently been described in heavy concentrations in two of the specialized sensory nerve-endings of human skin (Hurley and Mescon, 1956; Beckett *et al.*, 1956). These endings, both of which are especially prominent in the skin of the palms and soles, are the Meissner corpuscles, which are concerned with light touch and which are superficially placed within the dermal papillae, and the Pacinian corpuscles, which are believed to register pressure and are more deeply situated in the dermis and subcutaneous tissue. In the Meissner corpuscles, the enzyme is distributed throughout, but seems to be oriented transversely, conforming to the lamellar configuration of these bodies. It appears that it is concentrated in the cytoplasm of the "tactile" cells which are layered transversely within the body of the corpuscles. In the Pacinian corpuscles, non-specific ChE is limited in its distribution to the central core surrounding the axis cylinder in the very heart of the end-organ.

The precise significance of this enzyme in these sites is still conjectural. As far as is known, non-specific ChE, unlike specific ChE, is not required for the hydrolysis of acetylcholine under physiological conditions and is not directly concerned with the mediation or transmission of nerve impulses (Koelle, 1955*a*). However, the presence of high concentrations of non-specific ChE in the specialized sensory endings described above prompted us to examine other specialized cutaneous nerve-endings, in an effort to determine the extent of the distribution of this enzyme within the cutaneous sensory system. The following report describes the localization of non-specific ChE in the specialized sensory nerve-endings of human genital skin, the "genital nerve-bodies" (Yamada, 1951) or genital corpuscles.

The genital corpuscles were described initially by Krause in 1866 as a variety of cutaneous end-bulbs (Krause, 1866). They are globoid or ellipsoid in shape and are variably-sized, averaging 0·03–0·08 mm. in greatest diameter. As a rule, they are situated in the sub-papillary or reticular layer of the dermis, but some are more superficially placed. In the female, these endings abound in the skin of the clitoris and are found in decreasing numbers in preputial

skin, the labia minora and labia majora. In the male they are seen in the glans penis and prepuce. We found the genital corpuscles to be much more numerous in the clitoris than in the penis, as have others (Winkelmann, 1957*a*). Despite the designation " genital " corpuscles, these endings are by no means limited in distribution to genital areas. Although fewer in number, they have also been described in the lip, eyelid, tongue and perianal skin. On the basis of this distribution, Winkelmann has suggested the name " mucocutaneous end-organ ". Usually, several (two to six) myelinated nerve fibres enter the body of the end-organ and after losing their myelin sheath form many loops of nerve fibres with the corpuscle. There are relatively few nuclei in the genital corpuscles and those that are present are not arranged in any organized fashion. This is in sharp contrast with the Meissner corpuscles of volar skin which show a distinctive transverse lamellation of the cells. The genital corpuscles also lack a well-defined connective tissue capsule so that they have a rather indistinct margin and this again differentiates them from the well-encapsulated Meissner and Pacinian corpuscles. Little is known regarding the composition of the background extranuclear or extraneural substance of the genital corpuscles. A peculiar " granular " appearance of this tissue has been described but its significance is not known (Yamada, 1951).

Method.

Punch biopsies (0·5 cm.) were secured from the glans penis of two healthy adult Negro males after local procaine (2%) anaesthesia. In addition, specimens were secured from the clitoris and prepuce of two deceased white females, aged 50 and 46 years, within six hours of death. The cadavers had been placed

Table I.

Slide.	Substrate.	ChE's hydrolyzing. Specific.	ChE's hydrolyzing. Non-specific.	Inhibitor.*	ChE's inhibited.	ChE's stained.
A1	AThCH	+	+	None	None	Both.
A2	,,	+	+	DFP	Non-specific	Specific.
A3	,,	+	+	Nu683	,,	,,
A4	,,	+	+	B.W.284	Specific	Non-specific.
A5	,,	+	+	Eserine	Both	None.
C1	BuThCH	—	+	None	None	Non-specific.
C2	,,	—	+	DFP	Non-specific	None.
C3	,,	—	+	Nu683	,,	,,
C4	,,	—	+	B.W.284	Specific	Non-specific.
C5	,,	—	+	Eserine	Both	None.

* The inhibitors were employed in the following concentrations :
DFP (Diisopropylfluorophosphate), 5×10^{-9} M.
Nu683 (Dimethyl carbamate of (2-OH-5 phenylbenzyl)-trimethylammonium bromide, 3×10^{-5} M.
B.W.284 (1,5 bis (4-allyl dimethylammonium phenyl) penten-3-1-one dibromide, 3×10^{-4} M.
Eserine (physostigmine salicylate), 5×10^{-4} M.

in a mortuary refrigerator (2°–4° C) within 1–2 hours after death. All of the skin specimens were placed on dry ice immediately upon removal and transported to the laboratory where they were stored in the deep freeze until studied histochemically.

Frozen sections were cut at 10–15 μ and then carried through the histochemical procedure of Koelle (1955*b*) for the localization of the ChE's. Acetylthiocholine (AThCh) and butyrylthiocholine (BuThCh) were used as substrates and a variety of inhibitors were employed to allow for selective activity of each or both of the enzymes (Table I). Incubation periods were 30, 60, and 120 minutes.

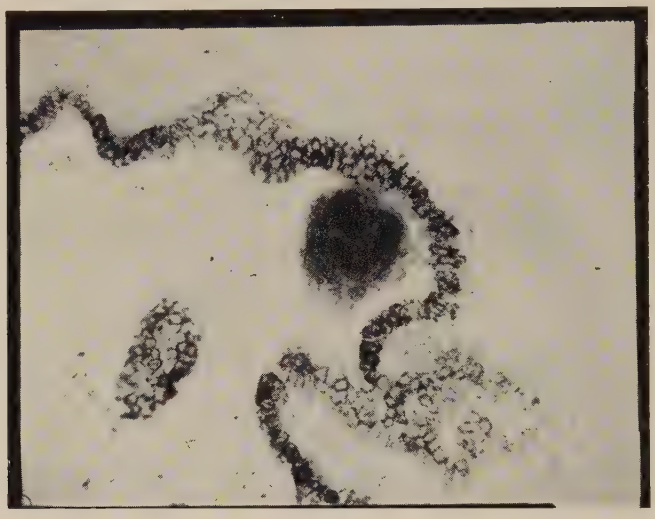

FIG. 1.—Non-specific cholinesterase in genital corpuscle of penile skin. The dark-staining globular body just beneath the basal layer of the epidermis is a genital corpuscle. The staining of the basal-cell layer is melanin. Incubation period 60 minutes. × 140.

RESULTS.

Examination of the sections so treated revealed the presence of heavy concentrations of non-specific ChE in the specialized nerve-endings of both male and female genital skin (Fig. 1). The staining was diffuse throughout the corpuscle and there was no suggestion of any special cellular distribution of the enzyme. We were unable to visualize with certainty any nerve fibres within or leading to the corpuscle, regardless of whether the sections were stained for either or both of the ChE's. Specific ChE was observed in isolated nerves and in occasional red blood cells scattered throughout the sections.

DISCUSSION.

Over the years, much confusion has arisen regarding the various types of specialized nerve-ending found in human skin. New forms have been described

simply on the basis of variations in size or shape of the ending. After a recent series of detailed studies in which he employed a special silver stain, Winkelmann was able to identify only three basic types of specialized nerve-endings in human skin (Winkelmann, 1957*a*, *b*; Winkelmann and Osment, 1956). The three varieties defined are the tactile corpuscle of Meissner including the Merkel-Ranvier tactile disc, the Pacinian corpuscle, and the genital corpuscle or "mucocutaneous end-organ". These endings may be distinguished on the basis of their cellular organization, the arrangement of the stromal tissue, the presence or absence of a capsule and their position in the skin. If this concept is correct—and we have every reason to suspect that it is—then the present demonstration of non-specific ChE in the genital corpuscles, coupled with the previously noted localization of this enzyme in the Meissner and Pacinian corpuscles, indicates that non-specific ChE is present in all of the varieties of specialized nerve-endings of human skin. Such endings may therefore be readily identified by the presence of this enzyme.

The function of non-specific ChE in these locations is still unknown. There is evidence to indicate that it has no importance in the immediate processes concerned with the transmission of cutaneous sensation (Hurley and Koelle, 1958). However, it may serve some other function in the maintenance of these structures and its absence or inhibition over a prolonged period might produce an alteration or loss of sensation in the area.

It is a pleasure to acknowledge the valuable suggestions of Dr. George B. Koelle during the course of this study. The photomicrograph was taken by Mr. Edward Glifort.

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References.

Beckett, E. B., Bourne, G. H. and Montagna, W. (1956) *J. Physiol.*, **134**, 202.
Hurley, H. J. and Koelle, G. B. (1958) "The effect of inhibition of non-specific cholinesterase on perception of tactile sensation in human volar skin," *J. Invest. Derm.* In press.
——— and Mescon, H. (1956) *Brit. J. Derm.*, **68**, 290.
Koelle, G. B. (1955*a*) *J. Neuropath.*, **14**, 23.
——— (1955*b*) *J. Pharmacol.*, **114**, 167.
Krause, W. (1866) *Z. ration. Med.*, **28**, 86.
Winkelmann, R. K. (1957*a*) *Arch. Derm., Chicago*, **76**, 225.
——— (1957*b*) *J. invest. Derm.*, **29**, 347.
——— and Osment, L. S. (1956) *Arch. Derm., Chicago*, **73**, 116.
Yamada, K. (1951) *Tohoku J. exp. Med.*, **54**, 163.

STEROIDS AS A SUPPLEMENTARY TREATMENT IN LATE LEISHMANIASIS.

A Preliminary Report.

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Increased susceptibility to microbial invasion and the activation of a latent infection are known dangers of steroid therapy. Lowered resistance to pustular skin infections in patients receiving cortisone has even led to a fatal bacteraemia (Dougherty *et al.*, 1954). Latent tuberculosis also may flare up. In one of our own cases of dermatomyositis (not yet published) preliminary clinical and radiological examinations revealed an old apparently closed tuberculous infection. Treatment with cortisone, together with streptomycin, provoked a re-activation which proved fatal. Some of our pemphigus vulgaris patients on prolonged treatment with this hormone developed serpiginous pustular eruptions, phlegmonous lesions and deep abscesses resistant to therapy.

These manifestations are accepted as due to a diminished opposition to bacterial multiplication subsequent to changes in the host's defence mechanism. In extreme cases there seems to be a complete collapse of the defence barriers. Although this chain of events is generally undesirable it may nevertheless be asked whether in some circumstances it may not be harnessed to a controlled therapeutic procedure. Observations on the use of steroids in syphilis (Horne, 1952; Turner and Hollander, 1954; De Graciansky and Grupper, 1955), their influence on the prognosis of severe tuberculous infection (Rennie and Read, 1955), and the good results reported in sarcoidosis (Sullivan *et al.*, 1953) are pointers in this direction. In the case of the first two chronic infections there exists a known causal agent and a more or less specific chemotherapy. If adequate concentrations of the requisite drug can be brought into intimate contact with the infective organism limitation of its activity or even its complete annihilation should result. The natural tissue "defence barrier" thrown up against the invader in many cases reduces the possibility of such intimate contact, and if the administration of steroids can breach or destroy this barrier the previously inaccessible focus may now become exposed to the force of the more specific measures, or to the immunity mechanisms already developed by the body. Experimental evidence for such an action of steroids is provided by the work of Cavallero and Sala (1951). They found that in rats deliberately

infected with coccidiosis, circumscribed granulomatous tuberculoid lesions developed, but if cortisone was administered at the same time a disseminated infection occurred, involving the spleen and lungs with strong inhibition of connective-tissue formation. Similar suppression by cortisone of granulation tissue experimentally produced in rats' liver was observed by Ungar, Laufer and Diengott (1956).

With these thoughts in mind we decided to investigate the effect of steroids on late leishmaniasis, used in conjunction with drugs already known to influence the disease. Unfortunately there are no truly specific remedies for leishmaniasis. Early cases are usually effectively treated by local chemical or physical means or by the internal administration of antimony compounds, salvarsan or streptomycin. These methods often fail in late leishmaniasis, by which term is implied either the recurrence of lesions after healing on the original site, or possibly new lesions, due to superinfection, which resemble from the beginning lesions of leishmaniasis recidivans (Dostrovsky, 1933, 1936, 1954, 1956; Dostrovsky, Sagher and Zuckerman, 1952).

Our investigation was divided into two parts—experimental and therapeutic.

Experimental investigation.—To determine the influence of the local and internal administration of steroids on the development of the leishmanin test.

Therapeutic investigation.—To determine the influence of the local and internal administration of steroids, combined with accepted therapeutic measures, on the clinical and pathological picture of the disease.

Experimental Investigation.

A full report of the experimental work (Dostrovsky and Cohen, 1957) has appeared elsewhere, and only brief comments will be made here.

The positive leishmanin test, like the tuberculin test, develops in 48 hours, and remains for many weeks. Histologically, a simple inflammatory reaction of the earlier stages later gives way to chronic inflammatory granulation tissue.

Cortisone administered internally over a prolonged period only reduced the size and intensity of the reaction. In order to prevent competely its development it was necessary to inject hydrocortisone into the skin together with the leishmanin antigen. Hydrocortisone injected into an already developed reaction produced partial inhibition of positivity, inversely proportional to the stage of development of the lesion. Histologically, this inhibitory influence was clearly demonstrable.

Other steroids investigated (cortisone, ACTH) did not possess the inhibiting properties of hydrocortisone when injected locally.

The results of the experimental investigation, showing the influence of locally injected hydrocortisone on the chronic inflammatory granulation tissue of the late leishmanin reaction, seemed to indicate the possibility of a therapeutic

value for steroids in this disease, in which the pathological process resembles the development of chronic granulation tissue in tuberculosis, syphilis and sarcoidosis.

Therapeutic Investigation.

The therapeutic investigation was carried out on eight patients with late leishmaniasis in whom all other accepted treatments, oral or parenteral, had been unsuccessful.

We at first attempted to cure the disease by the use of steroids alone, but this produced only partial improvement and our further investigations, simultaneously using corticosteroids and chemotherapeutic or antibiotic agents, form the basis of this report.

In general, the results were promising, cortisone or meticorten being administered together with antimony preparations (Fantorin ; Stibophen). Clinical resorption of the lesions occurred fairly quickly, but the treatment was of necessity prolonged, since after the initial satisfactory response resorption of the remaining pathological tissue ocurred very slowly. In the healing areas were revealed small spots which on diascopy had the typical appearance of leishmania tubercles. Histologically, these proved to be small granulomata. These lesions were less readily affected by the cortisone and antimony therapy, and it seemed that they might possibly be starting points for later recurrent attacks. The treatment schedule was therefore greatly prolonged, and consisted of a number of courses each lasting a period of months. Each course consisted of 30 injections of antimony, 3 to 5 c.cm. twice weekly, and 150 to 300 mg. cortisone was given orally each day, the dose being gradually reduced with the appearance of a satisfactory tissue response. Since it still seemed, however, that the drugs administered orally or parenterally were not achieving sufficient local concentration we started the injection of hydrocortisone intracutaneously into the leishmaniasis infiltrations. These local injections were given twice weekly, combined with the internal therapy, and in most cases the method gave good results. The influence of hydrocortisone injected into the lesions resembled that already noted in the experiments on the leishmanin test, and was even more pronounced because of the parallel antimony therapy. The technique demands the fairly accurate deposition of 0·1–0·2 c.cm. of the suspension (equivalent to 2·5–5 mg. hydrocortisone) intradermally into the focus. Since this is quite painful, and as the majority of the lesions are on the face (lips, cheek, nose) not all patients find the treatment acceptable. Although the local concentration achieved is quite large there is no high general concentration produced in the body, which is an additional advantage of this method. The disadvantages are the difficulty of exact intracutaneous deposition, occasional irritation, and the occurrence of yellow streaks or erosions at the site of the injection due to crystals of hydrocortisone, which persist *in situ* for lengthy

periods. It is possible that improvements in technique and the use of newer preparations with more prolonged local influence and less irritating effects will overcome these drawbacks.

Streptomycin was also given in addition to antimony in some of the cases in this series. It is known to influence favourably the early leishmaniasis process, but has so far failed when used alone in late leishmaniasis. In our cases a good response was obtained when it was combined with steroid treatment. We tried this combination in patients who had previously received antimony, and also in those who did not tolerate it.

It is worth while to record that in two cases in which the parasite could not originally be detected in the lesions it became possible to demonstrate them after steroid therapy had begun. Whether this was due to a breaking down of the host's immunity reactions or only to technical factors involved in the examination cannot be clearly decided; perhaps to a more intensive search and to repeated biopsies.

In none of the cases did the use of steroids produce any spread or generalization of the disease.

This report does not aim at presenting a complete scheme of treatment for late leishmaniasis, but merely a guide for the handling of those difficult cases previously resistant to all accepted treatment. When used with all the usual precautions and with close observation of the clinical progress we believe it permissible to introduce steroid therapy as a supplementary treatment for selected cases.

Summary.

An investigation into the use of steroids was carried out on eight cases of late leishmaniasis previously resistant to accepted treatment. Treatment with antimony or streptomycin was supplemented by oral cortisone or by hydrocortisone injected into the lesions.

The steroids proved effective in producing the resorption of the local tissue reaction to the infection. Hydrocortisone injected intracutaneously (intrafocally) seemed the most effective in this respect, but its use may sometimes be technically difficult or cosmetically undesirable.

In suitable cases the use of hydrocortisone intracutaneously (intrafocally) followed by prolonged courses of cortisone or meticorten given orally is likely to prove valuable supplementary treatment.

Thanks are due to H. A. Cohen, M.D., for his co-operation. This work was aided by a grant from the Ford Federation.

References.

Cavallero, C. and Sala, G. (1951) *Lancet*, i, 175.
Dostrovsky, A. (1933) *Harefuah*, **8**, 117 (Hebrew).
——— (1936) *Ann. trop. Med. Parasit.*, **30**, 267.
——— (1954) *Dia méd.*, p. 1555.
——— (1956) *Harefuah*, **50**, 165 (Hebrew).
——— Zuckerman, A. and Sagher, F. (1952) *Ibid.*, **43**, 29 (Hebrew).
——— Sagher, F. and Zuckerman, A. (1952) *Arch. Derm. Syph., Chicago*, **66**, 665.
——— and Cohen, H. A. (1957) *J. invest. Derm.*, **29**, 15.

Dougherty, J. W., Reisch, M. and Lewis, G. M. (1954) *N.Y. St. J. Med.*, **54**, 2964.
Graciansky, P. de, and Grupper, C. (1955) *Sem. Hôp., Paris*, **31**, 2141.
Horne, G. O. (1952) *Brit. J. vener. Dis.*, **28**, 106.
Rennie, H. M. and Read, J. (1955) *Aust. Ann. Med.*, **4**, 135
Sullivan, R. D., Mayock, R. L., Jones, Jr., R. and Beerman, H. (1953) *J. Amer. Med. Ass.*, **152**, 308.
Turner, T. B. and Hollander, D. H. (1954) *Amer. J. Syph.*, **38**, 371.
Ungar, H., Laufer, A. and Diengott, D. (1956) *Amer. J. Path.*, **32**, 859.

A NOTE ON THE TREATMENT OF EPITHELIOMATA BY DERMABRASION.

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Burks (1957) mentions the use of dermabrasion in the treatment of epitheliomata, and regards it as a useful method. He also mentions its use in removing keratoses. The planing of skin affected by radiodermatitis he notes may be followed by slow healing and scarring, and he attributes this to the absence of dermal appendages for the regeneration of the skin ; but he thinks that improvement follows the treatment.

For just over a year I have been treating several patients with epitheliomata in this way ; two of them had radiodermatitis as well. The initial results have been successful.

Table I.

Case.	Sex.	Age.	Lesion.	Site.	Notes.
1	F	64	Basal-cell carcinoma	Groin	—
2	,,	68	Basal-cell carcinoma	Lumbar region	The lesion had been apparently excised in 1956 and recurred in 1957 successively at two sites. Each was planed.
3	M	65	Basal-cell carcinoma	Lumbar region	—
4	F	58	Basal-cell carcinoma	Lumbar region	Treated with X ray in 1954 and recurred.
5	M	83	Intra-epidermal carcinoma	Pinna	After the first planing, it was apparent that some of the lesion persisted ; the remainder was planed again, using xylocaine instead of an aerosol.
6	M	61	Basal-cell carcinoma and keratoses on area of radiodermatitis	Upper lip (the area from the nasal vestibule to the vermilion border, extending from the midline to a line joining the ala nasi to the angle of the mouth on the left)	Three treatments—for the second and third xylocaine was used.
7	M	70	Intra-epidermal carcinoma	Pinna	Local anaesthesia with xylocaine.
8	M	67	Squamous-cell carcinoma (superficial and well differentiated)	Vermilion border of lower lip	Ditto.
9	M	57	Basal-cell carcinoma	Anterior abdominal wall	—
10	M	50	Multiple basal-cell carcinomata	Trunk	Local anaesthesia with xylocaine for smaller lesions, and aerosol for larger ones.
11	F	52	Basal-cell carcinoma	Upper back	—

In all cases the diagnosis was confirmed by biopsy. The area planed included a margin (2–5 mm.) of normal skin. The equipment used was that described by Pegum (1957). In some cases however a 2% solution of xylocaine (lignocaine) with adrenaline, 1 in 80,000, was used to produce local anaesthesia instead of an Arcton or Freon spray consisting of fluorinated hydrocarbons. This change seemed advantageous when treating small neoplastic areas, making it easier to judge when they had been adequately removed. Most of the patients who had both agents preferred xylocaine.

The details of these cases are presented briefly in Table I.

Comment.

Cases 1, 3, 9, 10 and 11 are illustrations of the use of dermabrasion in straightforward cases.

In Case 2 the method was particularly useful; any other would have been difficult to apply to the fragments of recurrence scattered in a stellate scar.

In Case 4 a basal-cell carcinoma had been treated by x-rays in 1954. Recurrence was proved histologically in 1957 when the clinical appearance was that of an ulcer with a raised edge in the centre of an area of x-ray dermatitis. Further x-ray treatment was out of the question, and excision would have meant extensive intervention and grafting; dermabrasion was tried in the hopes of solving or partially solving the problem.

The method seemed useful in Cases 5 and 7, being sufficiently precise to deal with small areas of growth in the intricacies of the pinna, and much less painful than the repeated applications of carbon dioxide snow which would probably have been employed otherwise.

Case 6 is a retired tea-planter with radiodermatitis following the use of x-rays and radium for keratoses and epitheliomata on the face. A triangular area involving the whole of the left side of the upper lip was particularly badly affected, the skin showing atrophy, pigmentation, telangiectasia, multiple small keratoses and a dome-shaped basal-cell carcinoma. Three treatments have been needed here to deal with the basal-cell carcinoma. Improvement has been considerable, the skin of the whole area being firmly healed. There is no sign clinically of the basal-cell carcinoma. If successful the treatment will substitute a few sessions of mild inconvenience for admission to hospital, general anaesthesia and extensive surgery.

In Case 8, the lesion clinically was diffuse and without induration, consisting of a superficial plaque on the vermilion border of the lower lip with some surrounding scaling and fissuring. This impression was borne out by the histological report. Healing was rapid, and the mucous membrane remained sound, but within a few weeks a firm indurated disc developed deep to the planed area. A biopsy from this disc showed only a nodule of scar tissue under epidermis showing no malignant change. He will be observed closely.

The rate of healing did not seem to differ significantly in areas which had been the site of radiodermatitis from that elsewhere. The healed area was smooth and atrophic, but less pigmented than before. The rate of healing in the two cases of intra-epidermal carcinoma on the ear was a little slower than in the other lesions ; ultimately however the skin was sound and no scarring was apparent, whereas in the cases of basal-cell epithelioma on the trunk a faint scar was left.

This series is small, and no patient has been followed for much more than a year. It is recorded in the belief that dermabrasion is a method worthy of trial, where it is readily available, for the treatment of epitheliomata particularly in elderly patients, those with multiple lesions, and where there are difficulties in the way of excision or radiotherapy. It is simple, safe, free of unpleasant sequelae and causes little inconvenience to the patient. At best it may result in cure, and it does not make further treatment, if such be ultimately needed, any more difficult to give. Careful supervision of the patients afterwards is essential.

I should like to thank Dr. Pegum for his helpful advice.

References.

Burks, J. W. (1956) *Wire Brush Surgery.* Springfield, Illinois : Charles C. Thomas.
Pegum, J. S. (1957) *Proc. Roy. Soc. Med.*, **50**, 607.

THE NYLON BRUSH.

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During recent years, a number of patients have been advised to consult me for hairfall which had resisted many forms of treatment. In February 1954 a skilled trichologist sent to me a young man, aged 27, whose loss of hair had a puzzling appearance and distribution. Apart from the usual retreating hair line on both temples, this patient had a large, almost bald region of a triangular shape on the right side of the vertex. The trichologist said that this area had so steadily enlarged when under treatment that he suspected some obscure infection. The patient confirmed the report that the bald region had slowly but steadily increased for over a year ; then rapidly for three weeks. On close examination I saw many short hairs of unequal length ; the majority were very short, several showed frayed ends. At first I suspected trichotillomania, but under the microscope the hair ends were seen to resemble trichorrhexis nodosa. I instituted treatment with oil and massage of the scalp. In March I found fewer hairs with frayed ends, but no evidence of regrowth. I enquired what sort of a brush was being used. The patient was uncertain and went home to find out, then telephoned that he had used a nylon brush for over a year and had applied it with special vigour along the right side of the vertex, hoping thus to stimulate growth of new hair. I told him to get a bristle brush at once. The hairfall ceased. Towards the end of June, when he called to report success, I was astonished to see that the original bald area was covered with strong hair of normal length and appearance.

When seeking a cause for the unusual appearance of this young man's scalp, I had recalled the case of a nurse whom I had seen several years before. A physician in the hospital had noticed that the nurse had lost much of her thick, curly hair, and sent her to me for advice. I ordered a stimulating lotion, ultra-violet to the scalp and endocrine treatment suitable for her menopausal time of life ; but there was only slight improvement. On careful examination with a powerful magnifying glass, I found several small areas on the vertex where the hairs were very short, with frayed ends ; the microscope revealed trichorrhexis nodosa. She had been rubbing those areas forcibly with a nylon brush. A bristle brush was ordered ; she reported from the country that her hair had soon recovered. It was the recollection of that case which led me to suspect the possibility that a nylon brush might be the cause of the strange baldness of the patient above described.

In April 1951 I was consulted by a man of 32 who had been losing his hair

for over a year. Many short hairs had the broken ends of trichorrhexis nodosa. This patient had begun to wonder whether his recently acquired nylon brush could have played any part in his loss of hair. He followed my advice to resume the use of his old bristle brush. As I did not hear from him again, there is little doubt that he recovered.

In February 1957 a young lady, aged 28, was sent to me by her general practitioner, Dr. John Nesfield, for marked loss of hair. He had improved her general health, but the hairfall had not ceased. There was a history of dermatitis and scaling over the vertex and in three months that region had become almost bald. After treatment for the removal of the scales, I found that she had been using a nylon brush, and I advised her to use only a bristle brush. In a short time her doctor reported that the hair was growing in well and that the young lady wished me to be told that she had been so unhappy about the appearance of her scalp that she had often felt suicidal.

In August 1957 Dr. Nesfield sent me another puzzling case. This was a boy aged 15 who had been steadily losing hair over the vertex for about three years. The boy was very nervous about this condition because his school mates teased him, saying that he would soon be bald like his father. The boy was healthy and his body was well tanned because sunbathing was encouraged by the headmaster of his school. I found the condition of the scalp was healthy, inasmuch as there was no scaling nor oiliness, but the hair was very thin over the whole of the vertex. On questioning his mother, I found that the boy had used a nylon brush for about three years before I saw him. At once a bristle brush was substituted and by the end of September the hairfall had ceased and strong new hairs were growing in.

Since that date, Dr. Nesfield has sent me notes of quite a number of cases of hairfall which ceased when a nylon brush was replaced by a bristle brush. One of his relatives had in youth very thick hair ; it was becoming thinner over the vertex as she reached the forties, but she supposed that this was natural at her age. However, when she substituted a bristle brush, hairs on the vertex became noticeably improved. Another case was that of a man aged 47. The crown of his head had been bald since his twenties, but on the sides and back of the head thick wavy hair remained. In November 1957 he noticed that the side and back hair was becoming very thin. He showed the brush he was using ; it was a beautiful object with sharp, hard tips. The patient substituted an old bristle brush which had belonged to his grandfather and by mid-March the hair had returned, thick and wavy, on the sides and back of the head.

When Dr. Nesfield, visiting his patients, sees a brush loaded with hairs, he examines that brush, and so far has always found a nylon with hard and pointed ends. On examination of the hairs, he was struck by the fact that they did not appear to be frayed, but *pulled* out with roots intact. He tested one of these

brushes on a coat ; its material became threadbare as pieces clung to the points of the brush.

I made enquiries amongst friends and colleagues. Two observant women used a nylon brush only occasionally. They had noticed that more hairs came out with the nylon brush, but had not realized that there was any connection. They had used a nylon brush for brief periods, as when on a visit, because their nylon brushes looked attractive on a dressing table.

I have visited many chemist's and hairdresser's shops and asked the assistants to show me the nylon brushes which they sold. I found that modern nylon bristles have very different points. Three types can be distinguished when one examines the tips under a strong magnifying glass :

(i) Rounded points, like the head of a match—safe to use.
(ii) Square points, which look as if cut square—not safe.
(iii) Square-cut ends, gently rounded off—not so harmful.

Fig. 1.

I examined three nylon brushes. One came from a friend who had short, strong hair waved with a " home perm ". After using the brush once, she was so shocked to see the amount of hair left on it, that she put it aside for good. The brush had eight rows ; each row had thirteen tufts of stiff, strong, square-cut nylon filaments of unequal length ; these did not bend on firm pressure by my finger. I gently removed several hairs from the thick tangle firmly embedded at the base of the nylon tufts. Many of the hairs were not broken ; they had been *pulled* out. The roots were clearly seen under the low-power lens of my microscope. Several other hairs were broken, some so frayed that the fibres spread out like twigs from a tree (Fig. 1).

One of my colleagues, a very intelligent woman, had hair so long that it reached her waist. When travelling she had used an artistic nylon brush, and was dismayed to find that it was full of fallen hairs. The loss could not be attributed to ill health for she was at that time well and strong. The hairfall

ceased when she resumed her usual bristle brush. On examining her nylon brush, I found the tufts resilient, with square-cut ends, which were gently rounded, i.e. it belonged to type (iii), the comparatively harmless type of brush. But in this case, a stronger stroke was required when brushing her unusually long hair. Some of these fallen hairs, she found, had been *pulled* out with the roots.

Another friend lent me a nylon brush which she had used for a long time without harm to her hair. The brush was small, having only four rows with ten tufts. Its nylon tufts were resilient and easily yielded to gentle pressure by my finger. Although the tips were square-cut, they did not convey any sensation of resistance to the finger. Possibly this explains why her hair had not suffered from its use.

Not until a few years ago did I realize that the old-fashioned hair brush was becoming rare. Its bristles, taken from the hogs and wild boars of Siberia and the coldest regions of Manchuria, are now difficult to obtain and the need to produce another type of brush resulted in the nylon brush. This brush has bristles composed of monofilaments of synthetic nylon which are cut to the required length. This process can leave an uneven square end, which is injurious (type ii). Some makers of nylon brushes have succeeded in producing a rounded end (type i). Other firms have replaced the nylon with moulded polythene quills which are smooth, resilient, with rounded ends. This ensures that the hair shafts do not become entangled, frayed, or pulled out by the roots.

In comparison with serious illness, loss of hair may appear to be a trivial complaint, but in both men and women it often causes anxiety and mental suffering ; indeed, many young men have told me that their fear of early baldness has pervaded their thoughts so much that they could not concentrate upon their studies. For that reason I decided that this article must be written.

AN UNUSUAL CASE OF LEPROSY.

N. MUKERJEE, M.B., B.S., D.T.M., D.P.H.(Cal.), Officer-in-Charge,
S. GHOSH, M.B., B.S.(Cal.), D.T.M.(Cal.) D. Bact.(Lond.) Asst. Professor,
S. KUNDU, M.B., B.S., D.T.M. & H.(Cal.), Asst. Professor.

Leprosy Research Department, School of Tropical Medicine, Calcutta.

Leprosy is essentially a disease of the dermis and the peripheral cutaneous nerves. It is a well observed fact that *Myco. leprae* has a special predilection for certain areas of the body surface—the face, buttocks, shoulders and exposed parts of the extremities, and that lesions are more frequent over these sites. In lepromatous cases the disease process is usually generalized, whereas in the non-lepromatous type the distribution is more selective. The probable reasons for this have been discussed by Mukerjee *et al.* (1958). Certain parts of the body surface are generally found to be more or less immune, e.g. the scalp, palms, soles, axillae and scrotum. Although not frequent, lesions on all these uncommon sites, except probably the last one, have been reported previously. Recently a case was seen in which involvement of the scrotum only was observed and for this rare clinical manifestation, the case is reported below.

Case Report.

An Indian boy aged 6 years attended the out-patient clinic on 10 : ix : 1957. A tiny erythematous and slightly raised lesion had appeared on the scrotum two months before ; some treatment was applied locally without any effect. The lesion gradually increased in size and other similar erythematous and raised lesions developed over the scrotum within a short period. No history of leprosy was traceable in the boy's family, but they live in an endemic area (of leprosy) in the town.

On examination the original lesion on the scrotum extended on either side of the median raphae and was erythematous, moderately indurated, smooth, and shiny-looking with a sloping margin. The lesion was soft and resembled a cyst. Other lesions over the scrotum were tiny, erythematous, thickened and glistening, with indistinct margins. Superficial anaesthesia could not be detected owing to the young age of the patient and his intelligence being below average but analgesia as detected from reflex response to pin-pricks was present over all lesions. No nerve was found to be thickened.

Investigation.—Routine slit and scrape smears were taken from the lesions on the scrotum and no acid-fast bacillus found.

Lepromin test with standardized refined antigen was negative.

Histology.—A biopsy was taken from the scrotal lesion and stained by haematoxylin-eosin and Ziehl-Neelsen techniques. Histopathological study of the section showed moderate infiltration in the dermis with diffuse loose granuloma. The subepidermal zone was infiltrated only in places, the granuloma consisting chiefly of small round cells and a few epithelioid cells. A few multinucleated giant cells of Langhans type were found in the deeper parts of the dermis. Nerves were slightly infiltrated and there was a moderate degree of congestion of blood vessels in the dermis. Vacuolated cells

were not found. Ziehl-Neelsen stain showed several acid-fast bacilli both in the granuloma and in the dermal nerve twigs. The histopathological picture was therefore, that of a " borderline " case of leprosy.

Discussion.

The incidence of a primary leprous lesion over the scrotum in non-lepromatous cases is rare, probably because the part is not commonly exposed to infective sources. But on rare occasions, as in this case, the development of lesion on such an area may be explained as follows :

It is customary in India to carry a child on the waist of parents or other relatives and the scrotum is one of the parts which comes into intimate contact with the person who carries the child. Repeated and close contact is therefore probable at this part where bacilli may enter and may cause a lesion later on. Moreover, this child came of a poor family and went mostly bare-bodied while being carried: he also gave a weak lepromin reaction. The conditions favourable for infection were therefore present in this case but the infective source was unfortunately not traceable.

Tuberculoid lesions on the scrotum have been noted previously both in children and adults, but a lesion of the " borderline " type in the scrotum of a child is rare and we think not hitherto reported. Such lesions have characteristics intermediate between typical tuberculoid and lepromatous lesions, and the prognosis in such cases is in between that in the latter two types.

Reference.

Mukerjee, N., Ghosh, S. and Kundu, S. (1958) *Ind. J. Derm.* **3**, 94.

A CASE OF TOXIC EPIDERMAL NECROLYSIS (LYELL).

D. GILL.
Major, R.A.M.C.

The following case is reported as an example of the unusual scald-like dermatosis described by Lyell in 1956.

The patient was a married multiparous Gurkha woman aged 23. She had been treated in hospital in Hongkong between September and December 1955 for a severe bullous eruption on the thighs, buttocks and arms, which was diagnosed "acute pemphigus". No clinical details or results of investigations were recorded, but she was very ill and the lesions apparently were septically infected. Extensive areas of hypopigmentation and mottling, with some atrophy, remain at the affected sites.

In February 1957 she was first seen by me. She had a fine vesicular dermatitis of the hands and elbow flexures of uncertain origin, probably from a local application. It settled with bland therapy.

In July 1957 she was seen again at the request of her doctor. There was pruritus and redness of the left antecubital fossa and she was emotionally upset and agitated. Rest, sedation, and weaning of her 9-month-old baby, to facilitate admission to hospital if necessary, was advised. The condition subsided.

In August 1957 she was treated in hospital for monilial vaginitis, with excoriations of the inner surfaces of the labia. She had at this time desquamation of the fingers, forearms and thighs, but no vesiculation or inflammation. There were no signs of leprosy and she was afebrile and non-toxic; blood count and urine were normal. She was treated with amylobarbitone sodium and 1 : 1000 gentian violet lotion locally. She was also given 4·0 ml. of tetrachloroethylene for ankylostomiasis. She left hospital cheerful and with the excoriations healed.

Four days later she was readmitted. She had universal erythroderma, with striking oedema of the areas affected in the previous illness in Hongkong. A few bullae were developing on the neck. She was toxic, with pyrexia of 103° F. and felt a burning pain in the skin. She was menstruating. Physical examination was otherwise normal. She was thought to be suffering from a drug eruption; the tetrachloroethylene had been given 9 days before, and she had been taking amylobarbitone sodium for 20 days.

Treatment was started with corticotropin, 25 units *i.m.* every 6 hours.

The next day she was less toxic and the fever was less (101° F.). The skin was less livid and superficial epithelial loosening was developing on the forearms. More flaccid bullae were appearing on the neck. She had a productive cough and diminished breath sounds at the left base. Oxytetracycline, 250 mg. eight-hourly, was started.

On the third day she was much less toxic and the fever was settling (99° F.). The erythroderma had subsided and extensive scald-like blisters had developed on the neck, arms and dorsa of feet. She still had considerable itch and pain. Cortisone, 100 mg. eight-hourly, was substituted for the corticotropin, which was gradually withdrawn in the next 36 hours.

From the fourth day onwards the temperature remained normal. She was well but itchy, and the scald-like lesions began to heal uneventfully. Oxytetracycline was stopped on the seventh day and cortisone on the eighth. She left hospital on the ninth day with all areas healing cleanly.

She has remained well since, and was last seen on 8 March 1958, when she was

four months pregnant and complaining of itching of the arms and vulva. Apart from leukorrhoea there was no objective abnormality.

Investigations in hospital (blood count, urine and chest skiagram) revealed *Esch. coli* pyuria and a mild polymorphonuclear leucocytosis with shift to the left. Blister fluid smears and scrapings from blister floors showed large and small lymphocytes and a few eosinophils only. Unfortunately a skin biopsy was not performed.

The patient denied at all times taking any medicine of any kind apart from treatments prescribed by her doctors. Amylobarbitone sodium is an obvious suspect as the toxic agent, but she was taking this for at least 20 days before the onset of the rash, and she had taken barbiturates in July 1957 without trouble. The initial oedema of the previously affected areas suggests that the same toxin was responsible on both occasions ; this argues against barbiturates, at least in an allergenic capacity, for in that case one would have expected an immediate reaction on re-exposure during August.

There is a possibility that the combination of tetrachloroethylene and amylobarbitone might have tipped the scale, by a hepatotoxic mechanism, but that is in the realms of speculation.

Reference.

Lyell, A. (1956) *Brit. J. Derm.*, **68**, 355.

ROYAL SOCIETY OF MEDICINE.

SECTION OF DERMATOLOGY.

President—Dr. J. T. Ingram.

19 December 1957.

Addison's Disease.—Dr. R. M. B. MacKenna.

A woman, aged 30.

History.—No pertinent early history. Puberty normal. Gradual development of cutaneous pigmentation appearing with first pregnancy and accentuated with each successive pregnancy (1946, 1947, 1951). There has been a progressive deepening of colour in the past two years. Attack of pneumonia in 1953.

For four years, recurrent attacks of abdominal discomfort and nausea, with intermittent diarrhoea and constipation.

For one year, progressive increase in fatigue, listlessness and mental apathy, loss of one stone in weight.

Examination.—When first seen she was a thin, rather wasted woman appearing older than her stated age, with deep bronze-black pigmentation of skin, particularly of the face and light-exposed surfaces and pigmentation of gums and palate.

Blood pressure 75/50 mm. Hg.

Investigations.—Hb. 78%, W.B.C. 7400. Urine normal.

Plasma electrolytes : sodium 130 m. eq./litre (300 mgm./100 ml.), chlorides 102 m. eq./litre (595 mgm. 100 ml.), potassium 4·9 m. eq./litre (19·2 mgm./100 ml.), Glucose-tolerance curve flattened. Blood Kahn and Wassermann negative. Plasma cholesterol 385 mgm./100 ml. Blood urea 48 mgm./100 ml. Liver function test normal. 17-Ketosteroids 1·3 mgm. per 24 hrs.

Skiagrams : Chest normal, skull normal, abdomen showed bilateral calcification of suprarenal areas.

Therapy.—D.O.C.A., 5 mgm. with cortisone acetate 25 mgm. *b.d.* Maintenance therapy of cortisone 25 mgm. *b.d.*

The patient has had almost three months' treatment, during which she has lost her fatigue and apathy. Abdominal symptoms have disappeared. She has gained weight and feels much stronger. The pigmentation has begun to fade.

Comment.—When first I saw this patient, she told me that she had seen six doctors, but no diagnosis had been made. The points I want to make concern only those features which, in my opinion, could have baffled our colleagues.

Addison, when he described the condition, said that the pigmentation " pervades the whole surface of the body " but commonly is more severe on the face and neck and on a few other sites. In this case the pigmentation was chiefly on exposed parts ; it was not even particularly marked at sites of pressure which, according to some authorities, are often involved. Second, the degree of pigmentation before she received treatment was much greater than most of us expect, although it should have been remembered that Addison wrote that one of his cases was as deeply darkened as a mulatto. There was at that time one very characteristic feature *viz.*, marked pigmentation of the posterior surfaces of the hands with but little involvement of

the palms except in the palmar folds. Third, this patient noted pigmentation for a number of years before lassitude became a problem. Nowadays, it is recognized that this does happen in some cases; but because Addison emphasized falling off in general health and weakness as cardinal symptoms of the malady, it is often believed that asthenia is always an early symptom.

In regard to metabolic changes, her case was unusual in that the plasma sodium chloride value was not greatly diminished, but the excretion of 17-ketosteroids was considerably diminished and the patient had a low blood pressure.

Multiple Keratoacanthomata.—Dr. P. F. Borrie.

An English housewife, aged 45.

History.—Since April 1954, she has had 10 keratoacanthomata. Six of these have been observed and were typical. A lesion on the side of the nose recurred after curettage and electrocautery, but was cured at the second attempt. The original lesion on the right cheek was treated in a similar way, a very early lesion on the forehead was excised and early lesions on the chin and upper lip have been treated recently with electrocautery alone. The remaining five have healed spontaneously, including one on the left calf which measured 5 cm. in diameter. She began working in an engineering works 6 months after the appearance of the first lesion, but gets little contamination from oil. No relevant family history.

Examination.—Scars of keratoacanthomata on the nose, right cheek, both forearms right hand, right shin and left calf. Tiny pink nodules, with warty summits on the chin and upper lip. The second scar on the right cheek is of unknown aetiology.

Histology.—Biopsies from a lesion on the forehead and the large lesion on the left calf have been made. Histological examination of sections from the forehead show the appearances of a keratoacanthoma. The microscopical appearances of the lesion on the calf, however, are those of a well differentiated keratinizing squamous-cell carcinoma similar to that described by Fergusson Smith (1934).

Comment.—Very few cases of multiple keratoacanthomata have been reported in the literature and they are generally considered to be examples of multiple self-healing squamous-cell epithelioma. It is probable that the two conditions are fundamentally identical, but that the lesions in the latter are multiple, because of some genetically controlled constitutional predisposition, whereas keratoacanthoma occurring in otherwise normal individuals is nearly always single Although no pertinent family history was obtained in the present case, it would nevertheless appear that either diagnosis were equally applicable.

Reference.

Fergusson Smith, J. F. (1934) *Brit. J. Derm.*, **46**, 267.

16 January 1958.

Lymphocytic Infiltration of the Skin (Jessner).—Dr. Robert Warin.

A retired baker, aged 48.

History.—Widespread urticaria for 8 years, fluctuating in severity with intervals of freedom of up to six months. The wheals are partly suppressed by Phenergan, 35–50 mg. at night. Also for 8 years, recurrent patches over left side of the face and neck, occurring every 2–6 months. These start as papules which gradually increase in size, producing discs or rings. Usually they clear in 2–3 months, leaving normal skin, but at the moment lesions have been present for 6 months and are only just starting to clear. The condition is not affected by exposure to sunlight. No drugs have been taken other than those prescribed. Chloroquine 400 mg. a day was

given for 4 months without effect. X-rays 150r (65 kV.) to one patch showed no effect.

Histology.—Large patches of lymphocytes are present in the dermis, chiefly perivascular in distribution.

Comment.—There is little doubt that the general eruption is chronic urticaria, but the diagnosis of the patches on the face is not so clear. Against a diagnosis of lupus erythematosus profundus is that no scar or depression is left when the patches clear and at no time has there been a patch with the typical appearance of lupus erythematosus. The condition would fit that described as " Lymphocytic infiltration of the skin " by Jessner (1953), and reported in this country by Calnan (1957). It is of great interest that in this case there is chronic urticaria which has been present for the same length of time.

References.

Calnan, C. D. (1957) *Brit. J. Derm.*, **69**, 169.
Jessner, M. and Kanof, M. B. (1953) *Arch. Derm. Syph., Chicago*, **68**, 447.

Purpura Associated with Hyperglobulinaemia and Systemic Lupus Erythematosus.—Dr. B. Reiss and Dr. M. Feiwel.

A laundress, aged 44 years.

History.—The patient was originally seen in September 1957 with purpura and joint pains of 8 months' duration and an apparent sensitivity to phenytoin. She had been well until 1947, when she developed epilepsy. This was fully investigated on several occasions, the E.E.G. showing no specific abnormality. When first given phenytoin, erythema and pruritus resulted, so it was replaced by phenobarbitone and mysoline. In February 1955, severe iron-deficiency anaemia responded to iron but the E.S.R. was 75 mm./hr. Later, a short attack of urticaria settled spontaneously. In January 1951, she developed purpura on both legs, joint pains and Raynaud's phenomenon. The purpura has been present intermittently since then. It occurs in showers of petechiae mainly on the lower legs and less frequently and less densely on the buttocks, thighs and face. In September 1957, thinking that the purpura might be due to drug sensitivity, her doctor substituted mysoline by phenytoin, but as urticaria ensued, mysoline was restored.

There is no family history of epilepsy or allergy. She received chlorpromazine in 1955 but she has had no penicillin or sulphonamides.

General examination.—Normal. B.P. 110/95.

Investigations.—E.S.R. 107/mm./hr. (Westergren). L.E. cells were seen on two separate occasions in preparations from peripheral blood. Serum proteins 9·8 g./100 ml., albumin 4·5 g., globulin 5·5 g. Electrophoresis showed gross increase of gamma globulin, particularly gamma-2. Hb 11·1 g./100 ml. W.B.C. 4000/cu. mm. Platelets 100,000/cu. mm. No cryoglobulins. Clotting and bleeding times normal. Urine cell excretion normal. Skin biopsy showed vasculitis of superficial vessels. E.E.G. revealed slight generalized dysrhythmia.

Course.—A period free from all anticonvulsants did not reduce the purpura. At present she is receiving prednisone 5 mg. *q.d.s.* Malaise, which had lately been prominent, has improved, joint symptoms are less pronounced but purpura is much the same.

Comment.—A recent article (Leonhardt, 1957) referred to a family of 14 siblings of whom several had hyperglobulinaemia. One member had " hyperglobulinaemic purpura of Waldenström " (as reported by him in 1952) but later progressed to acute systemic lupus erythematosus. In the absence of a family history of epilepsy, it is possible that our patient's epilepsy, which began at the age of 34, is part of the systemic disease. L.E. cells, though scanty, were found in the absence of severe manifestations of lupus erythematosus. In Waldenström's patient they were found only after systemic L.E. had apparently been precipitated by phenylbutazone. Our case may progress more rapidly than Waldenström's, who had purpura for 15 years

before there was an acute exacerbation. The purpura must be considered a cutaneous vasculitis and part of her systemic illness.

References.

Leonhardt, T. (1957) *Lancet*, ii, 1200.
Waldenström, J. (1952) *Acta med. scand., Suppl.* **266**, p. 931.

Subcorneal Pustular Dermatosis.—Dr. I. Sarkany.

A boy aged $10\frac{1}{2}$ years.

History.—In July 1957, this boy was admitted to a fever hospital with 12 days' history of bullous lesions affecting the trunk, limbs, back of the neck and mastoid regions. A diagnosis of chickenpox was made, but this was subsequently revised to that of generalized impetigo and *Staphylococcus aureus* was said to have been isolated from one of the lesions. He was given a course of oral penicillin (5 g.) and ung. aureomycin. He failed to improve and was treated with erythromycin, 5 g. orally and Hibitane cream. Following discharge from the fever hospital, fresh lesions continued to appear.

When seen on 7 October 1957 there was a moderate number of crusted lesions with an occasional small flaccid blister, containing turbid fluid. Some of the lesions formed small groups in a gyrate pattern. The trunk and limbs were affected but the mucous membranes were normal.

Local application of 1% hydrocortisone lotion appeared to be very effective, but the improvement was not maintained. Complete clearance of lesions followed administration of 25 mg. dapsone daily. Slight relapse took place when the dose was reduced to 25 mg. every third day. The patient has not received any treatment for ten days.

Investigations.—The blood count was within normal limits. Histological examination showed that the blister is subcorneal in position. It contains neutrophil polymorphs. There is some spongiosis in the epidermis and a mild inflammatory infiltrate in the upper corium.

Comment.—The clinical and histological features suggest the diagnosis of subcorneal pustular dermatosis, as described by Sneddon and Wilkinson. Rapid suppression of the lesions and control of the condition followed treatment with dapsone. Other points of interest are the initial similarity of the condition to impetigo and the fact that it can occur in a child, which, as far as I could ascertain, had not been reported previously.

Discussion.

Dr. I. B. Sneddon: I agree with the diagnosis but this is the youngest case I have seen. Two of my cases were at first partially controlled by dapsone but gradually this has had less and less effect and they are at the present time covered with lesions. Of all the cases I have treated, some have cleared completely and the remainder have continued to have lesions despite dapsone.

Dr. D. S. Wilkinson: I agree with Dr. Sneddon. One of my cases appears to be clearing spontaneously without dapsone, though it undoubtedly helped her previously.

Dr. W. N. Goldsmith: Unless my diagnosis is wrong I have seen more cases of this sort in children than in adults and it is not very easily controlled, although they clear up eventually.

The following cases have been reported in *Proc. R. Soc. Med.*, **51**, 421.

Psoriasis.—Dr. D. I. Williams.

Reticulohistiocytoma.—Dr. Denis Sharvill.

Cutaneous Haemangiomata and Bony Deformities.—Dr. J. Everall and Dr. M. Feiwel (for Dr. G. B. Mitchell-Heggs).

The following cases also were shown :

Metastasizing Sweat-gland Sarcoma.—Dr. G. Allen, Mr. Norman Tanner and Dr. M. Feiwel.

Scirrhous Sweat-gland Adenocarcinoma of Lip.—Dr. M. Feiwel and Dr. H. Haber.

Sarcoidosis.—Dr. R. H. Marten (for Dr. D. I. Williams).

Tuberculosis Cutis Colliquativa Ulcerosa.—Dr. R. S. Francis and Dr. M. Feiwel.

Onchocerciasis.—Dr. I. Sarkany.

Parapsoriasis Lichenoides.—Dr. P. J. Hare.

Porokeratosis (Mibelli).—Dr. R. H. Marten (for Dr. Sydney Thomson).

Angiomatous Naevus of the Gums.—Dr. D. I. Williams.

Erythema Annulare Figuratum.—Dr. J. Everall (for Dr. G. B. Mitchell-Heggs).

NORTH OF ENGLAND DERMATOLOGICAL SOCIETY

Leeds, April 1958.

Madura Foot (Mycetoma).—Dr. Anning, Dr. La Touche and Dr. Hunter.

A West Indian negro aged 27.

History.—In this country 7 months. Formerly a bare-footed fisherman living on a wooded island. He injured the left foot at age of 15 years, probably on a wood splinter. Painful swelling of foot in the region of this injury appeared three months ago.

Examination.—Granulomatous indurated lesion about 6 × 5 cm. on the lateral aspect of the left foot with some ulceration (Fig. 1).

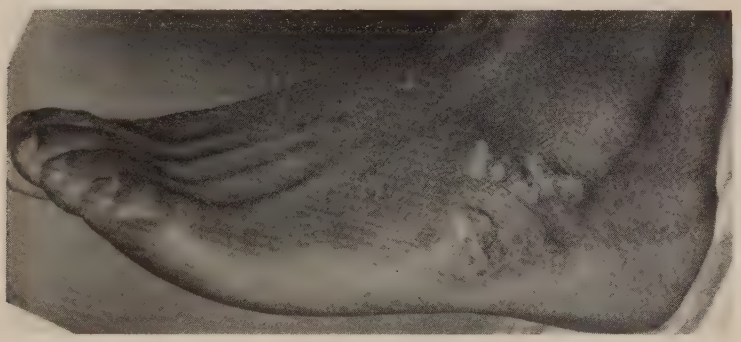

Fig. 1.

General examination normal apart from a cheloid on front of chest.

Investigations.—Wasserman reaction negative.

Biopsy.—Tissue very tough to cut. Small black grains visible in dermis.

Histology.—A pyogenic inflammatory reaction with occasional giant cells. A granule of dense, thick-walled mycelium is present with an abscess cavity.

Skiagram of foot.—No bone disease.

Mycology.—Provisionally indentified as *Madurella grisea.*

Epithelioma Cuniculatum.—Dr. J. Ingram.

A man aged 48.

History.—The lesion started in January 1956 as a corn under the anterior arch of the left foot. Six months later it was about one inch in diameter, and it is now growing rapidly.

Examination.—Large fungating hyperkeratotic epithelioma 5 × 7 cm. with fleshy everted margin under the anterior arch, pressing forward under the toes (Fig. 2). Hard induration through to dorsum of foot and bases of toes.

Treatment.—Amputation of foot, July 1957.

Histology.—" A warty fungating tumour 7 × 5·5 cm. with overhanging edges involves the central part of the sole reaching to the webs of the toes. Slicing shows

a white friable tumour extending into the subcutis and to a depth of 2 cm. Though most of the tumour lies superficial to deep fascia and tendon sheath, a nodule 1 cm. in diameter lies deeply around the head of the third metatarsal.

Fig. 2.

" Columns and islands of well differentiated squamous carcinoma enclose abundant keratin and parakeratin. Most of the tumour is superficial but deep extensions including cyst-like structures containing keratin involve the subcutis of sole and webs. The stroma in the depths of the tumour shows purulent foci. Areas of bone, possibly metaplastic, but more probably part of an infected metatarsal bone, are prominent in the inflamed areas.

" The appearances closely resemble those of the ' epithelioma cuniculatum ' described by Aird *et al.* (1954) *Brit. J. Surg.*, **42**, 235."

THE FRANCO-BRITISH MEETING.

Nantes, May 1958.

The third Franco-British meeting was held at Nantes this year under the presidency of Prof. P. Joulia and was arranged by Prof. Y. Bureau. It was attended by about 30 British dermatologists. On 9 May was a meeting of the *Société Francaise de Dermatologie et de Syphiligraphie* to which British visitors were invited. The day was taken up with many papers and a very full discussion on the nodular hypodermic eruptions of the legs.

The Franco-British meeting itself was on 10 May and began with a demonstration of clinical cases. Over 30 patients were shown and afterwards discussed. They comprised an excellent selection of rare and problematic dermatoses. The afternoon was devoted to a series of short papers, four by French workers and four from the British. These will all be published in a subsequent issue of the Journal.

On the following day we were invited to a delightful trip on the Gulf of Morbihan which occupied the whole day.

It was for all of us a most happy occasion to greet again our French colleagues and to join with them in the study of dermatological problems. The enthusiasm and cordiality of Professor Joulia and Professor Bureau and their compatriots contributed much to the pleasure of the occasion. The city of Nantes and its surroundings and the glorious French countryside were at their best at this time of the year. The hospitality and kindness extended to visitors will leave a cherished memory.

BRITISH ASSOCIATION OF DERMATOLOGY.

The Thirty-eighth Annual Meeting.

The thirty-eighth Annual Meeting of the British Association of Dermatology was held in Cardiff on 3, 4 and 5 July under the Presidency of Dr. J. H. Twiston Davies, with Dr. G. A. Hodgson as Vice-President.

At the Annual Business Meeting on Thursday morning, 3 July, the resignation of the Hon. Editor was received. This will take effect at the end of 1958 upon the completion of his ten years' service.

It was decided that the thirty-ninth Annual Meeting would be held in Glasgow on 9, 10 and 11 July 1959 under the Presidency of Dr. J. Ferguson Smith and the Vice-Presidency of Dr. J. Sommerville.

The following were elected to serve on the Executive Committee for 1958–59 :

President :	Dr. J. Ferguson Smith.
Immediate Past President :	Dr. J. H. Twiston Davies.
Vice-President :	Dr. J. Sommerville.
Hon. Treasurer :	Sir Archibald Gray.
Hon. Secretary :	Dr. H. J. Wallace.
Hon. Editor :	Dr. P. J. Hare.
Hon. Assist. Editor :	Dr. G. W. Bamber.

Members of Committee :

Dr. T. E. Anderson.
Dr. F. Ray Bettley.
Dr. P. Borrie.
Dr. Clifford Evans.
Dr. L. Forman.
Dr. S. C. Gold.
Dr. R. Hall.
Dr. G. A. Hodgson.
Dr. R. M. B. MacKenna.
Dr. G. C. Wells.

Dr. G. B. Dowling was elected to Honorary Membership and the following were elected to Honorary Foreign Membership :

Dr. H. Beerman.
Professor S. Jablonska.
Dr. G. M. Lewis.
Professor X. Vilanova.

Dr. C. D. Calnan and Dr. R. E. Church were elected Ordinary Members.

The rest of this day was devoted to a variety of papers : Dr. G. B. Dowling and Dr. P. F. D. Naylor jointly contributed papers on Buffering of the Skin Surface. They were followed by Dr. C. H. Whittle on Paronychia and the morning ended by an interesting account by Dr. Aneurin Hughes on his researches into hypersensitivity reactions in rabbits.

In the afternoon Dr. H. J. Whiteley described his experimental work with the production of tar papillomas and was followed by Dr. J. G. Coburn on the histology of acanthomata. After this Dr. J. D. Spillane gave an interesting account of the trophic changes which may be seen in the skin of neurological patients and Dr. L. P. R. Fourman discussed the endocrinological aspects of hirsuties.

On Friday morning, 4 July, a discussion on Lipoidoses and the Skin was introduced by Drs. J. A. Lovern, P. Borrie and R. H. Meara. There followed papers by

Dr. A. Lyell on Lipoid Dermato-arthritis and by Drs. R. E. Church and I. B. Sneddon on Annular Facial Erythema.

On Saturday morning a demonstration of 37 clinical cases of great interest was arranged by Dr. Hodgson and his colleagues. A printed booklet of case histories, beautifully illustrated, added distinction to a remarkable collection of cases.

On Thursday evening we were received by the President and his wife in the Banqueting Hall of Cardiff Castle. This magnificent castle formed an excellent setting to a most enjoyable reception and the hospitality of the President was greatly appreciated. On Friday afternoon a party of members and their wives struggled with the weather on a visit to St. Donat's Castle. Others descended into a coal mine at Nantgarw and a third party competed for the golf cup which was won by Dr. B. Thomas.

Cardiff is a very pleasant city which has an aspect of charm and dignity which usually surprises those who visit it for the first time. In addition to the help they received from these pleasant surroundings Dr. Twiston Davies, Dr. Hodgson and the Local Secretary, Dr. Waddington, and their wives, made a very great contribution to the success and pleasure of the Annual Meeting by their skilful management and genial temperament. The Association will remain always indebted to them for the success of the meeting.

BOOK REVIEWS.

Sarcoidosis.*

Those who have had the good fortune to visit Professor Karl Wurm in his eye sanatorium in the Black Forest will recognize his thorough and detailed observations of patients with sarcoidosis which are embodied in this handsome monograph. The emphasis of the work is on the intrathoracic radiological changes, which are divided into three stages—hilar lymphadenopathy, lymphadenopathy with pulmonary mottling and the end-stage of pulmonary mottling alone. The descriptions are supported by 180 excellent reproductions of chest radiographs.

Personal observation of this series is underlined by the fact that 139 pages (over half the book) are devoted to the clinical findings in 63 patients. Those who may tire of all these histories will be refreshed by glancing through the first names of the patients, all 63 of which are included; many of the names suggest their Bavarian origin, a fact which may be of epidemiological interest now that certain observations in the U.S.A. suggest the frequency of sarcoidosis in forested areas and a possible link with pine pollen.

The differential diagnosis of pulmonary sarcoidosis is discussed in detail. It is surprising to note the prominent inclusion of such a rarity as pulmonary syphilis, especially since beryllium disease occupies a relatively insignificant section. Forty-two pages are devoted to an exhaustive radiological differential diagnosis of sarcoidosis but both prognosis and treatment are dealt with in a mere last half-page of the book.

This monograph is not primarily intended for dermatologists and no link is established between the skin and intrathoracic manifestations of the disease, other than the use of skin biopsy for histological confirmation of sarcoid tissue. The brief historical background is incomplete for there is no mention of Robert Willan or of Jonathan Hutchinson. Occasional contributors to the literature of sarcoidosis are mentioned but no source references are given. This is a serious defect in a book of this kind. It is intended as an exhaustive treatise on certain aspects of sarcoidosis, and for this reason it could be considered as a reference book. But it is unfortunately a reference book without references! Its price alone prevents it from becoming a book of wider appeal.

D. G. J.

Mycology.†

"Medical mycology has come of age" say the authors, and there are good reasons for the growing interest the subject is arousing. The widespread adoption of standard culture media for the isolation and identification of parasitic fungi has resulted among other benefits in the sorting out and elimination of many of Sabouraud's forty or fifty different strains. This leaves a round dozen or so, in which it is now possible for dermatologists and others, hitherto hopelessly baffled and bewildered by the variety of types and sub-types, to take an intelligent and even keen interest. Moreover, the dermatologist of to-day is likely to take more trouble in his diagnosis of some of the commoner disorders, especially of the hands and feet, since he knows

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* *Der Lungenboeck im Röntgenbild.* K. Wurm, H. Reindell and L. Heilmeyer (1958). Stuttgart: Georg Thieme Verlag. Pp. 220. Illus. 180. Price DM. 78.

† *An Introduction to Medical Mycology.* George M. Lewis, Mary E. Hopper, J. Walter Wilson and Orda A. Plunkett (1958). Fourth Edition. Chicago: The Year Book Publishers, Inc. Pp. 453. Illus. 576. Price £5 15*s.* 0*d.*

that fungous infection may masquerade as "eczema", "pompholyx", psoriasis, pustular dermatoses, etc.

This book, appearing now in its fourth edition after ten years, has been almost completely rewritten and there are two new collaborators, one with special knowledge of deep mycoses and the other of botanical mycology. In spite of the expansion needed to cover new work the book's size and shape have not suffered. The authors present their subject in a way that is specially attractive to the clinician. For each fungus described there is a brief note about geographical distribution followed by a condensed account of clinical manifestations; under the next heading, mycology, there is a paragraph each on direct examination, cultural characters, culture mount, biopsy of culture, filtered U.V.R., animal inoculation, and differential laboratory diagnosis. Clinical diagnosis and treatment are also discussed. The information given is practical, precise, and generously illustrated with black and white photographs which have been carefully selected and reproduced. The classification of the fungi is in accord with the amended 1958 Medical Research Council Nomenclature (M.R.C. Memorandum 23, 1958).

There is a special chapter on superficial mycoses of infrequent or doubtul occurrence; one on the physiology and nutrition of fungi, which inevitably but unfortunately leaves out the latest work by Kapica and Blank (1957) on the utilization by *Candida albicans* of keratin for its sole supply of nitrogen; a chapter reviewing the host of non-specific measures used in treating superficial mycoses; and two pages on fungous diseases and the Workmens' Compensation Act. On the subject of systemic or deep mycoses, to which 124 pages are given, the reviewer is not qualified to comment except to say that the presentation makes easy reading and the plates are of the same high standard as the rest.

The authors modestly, but probably rightly, call this work an introduction, and as such it could not be equalled. But dermatologists will find it of value for constant reference in diagnosis, though the bibliography is limited and is already slightly out of date.

The sections on treatment are the least inspiring but this is because personal bias and training will almost certainly influence the choice of methods, largely empirical, that are available, and the authors can hardly be expected to please everyone. Occasionally they lapse, as when they say in candida infections of the skin (p. 161), "therapy should be directed toward the eradication of all foci both in the skin *and in the gastro-intestinal tract.*" The italics (mine) suggest an over-sanguine approach.

There are other queries. For instance, is tinea cruris (p. 6) still chiefly caused by *E. floccosum* infection? Also does favus behave differently in America? Reports from U.S.A. and Great Britain suggest that it is often a family infection transmitted to the third and even fourth generation by contact (Swartz, 1949; Carslaw, 1955; and others) and there is no mention (p. 53) of this well authenticated mode of spread. But these are minor points; the work stands firmly on its merits—wise selection and vivid presentation of the facts. The appeal to dermatologists should be irresistible, and the senior author probably had dermatologists and bacteriologists in mind when he remarked in his preface that there is still room for clinicians and part-time workers for investigation in this field. C. H. W.

Healing of Wounds.*

This little book contains ten short articles by different experimentalists mostly from Chicago, and the editor is Martin B. Williamson who is a biochemist. The object of the book is to correlate observations on the biological aspects of tissue repair with information at the biochemical (molecular) level. Much of the work

* *The Healing of Wounds.* Martin B. Williamson (1957). London: McGraw-Hill. Pp. 202. Price 54*s.* 6*d.*

described here is concerned with wound healing in laboratory animals and data of particular interest relate to methionine and ascorbic acid requirements in animals severely depleted of protein. A brief review by Matthew Taubenhaus of the influence of steroid hormones on granulation tissue is of particular interest to clinicians. Data presented by David S. Jones on proliferation of muscle cells following injury suggest that more parenchymatous regeneration takes place than is generally believed.

This book contains much information presented in a well digested form, and anyone interested in wound healing will find it useful. G. C. W.

Case Reports of the XI International Congress.*

This volume consists of the case reports of the 100 cases which were shown at the International Congress in Stockholm last year. Although the authors in their introduction describe them as fairly rare or moderately common, those who saw these cases will agree that many of them were most remarkable and worthy of being remembered throughout a dermatologist's lifetime.

The case reports themselves have been prepared with the greatest attention to conciseness and the elimination of unnecessary prolixity. The written report occupies the left-hand page and often takes up not more than a quarter of the page. Facing this on the right-hand page are photographs including histological illustrations. For each case there are usually four to ten illustrations all occupying the same page. As a result some of the pictures are not much larger than a postage stamp but they are so carefully selected that they convey very well the essential features of the disorder even to one who does not recall seeing the actual case.

Although, as the authors point out, this is not a comprehensive atlas it is nevertheless a valuable collection of unusual and rare cases. It is fortunate indeed that the President of the Congress and his officers decided that the cases should be published in this form and doubly fortunate that they should have entrusted these authors with the task. F. R. B.

Allergy.†

The authors provide a sound and up-to-date guide to the complex and controversial subject of allergy. Twenty pages are specificially devoted to dermatological allergy, and of particular interest to dermatologists are chapters on the allergic reaction, skin tests, reactions to insect bites, drug reactions, physical allergy, and collagen disease. These chapters contain much useful information, and the authors' views on aetiology and treatment are in line with current dermatological opinion.

Among points for criticism are the statement that the Senear-Usher syndrome is regarded as a form of lupus erythematosus, and the omission of carbromal and streptomycin from a list of drugs which commonly produce reactions. Allergy may or may not have a place in the causation of scleroderma, but if this condition is described at all, a clear distinction should be made between morphoea and acrosclerosis. H. T. H. W.

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* *One Hundred Clinical Cases Presented at the XIth International Congress of Dermatology, Stockholm* 1957. A. Lodin and H. Gentele (1958). Stockholm : Acta Derm-Venereol. Pp. 207. Price 40 Swedish Crowns.

†*Practical Allergy.* M. Coleman Harris and Norman Shure (1958). London : Butterworth & Co. Ltd. Pp. 471. Price 52*s*. 6*d*. net.

CURRENT LITERATURE

THE ALLERGIC DERMATOSES. A. Rostenberg. (1957) *J. Amer. med. Ass.*, **165**, 1118.

A thoughtful and informed general discussion of allergic dermatoses. The relationship between the allergic process and the skin lesions may be direct as in dermatitis venenata or the relationship between the lesions and the antigen-antibody union may be more remote. In the atopic individual, for example, skin damage as a result of antigen-antibody union is so infrequent that it can be ignored and skin tests are worthless and confusing. The " allergic " status of erythema multiforme, id reactions, cutaneous vasculitis and other conditions is reviewed. A. J. R.

HEMANGIOMAS—TREATED AND UNTREATED. G. C. Andrews, A. N. Domonkos, V. M. Torres-Rodriguez and J. K. Bembenista. (1957) *J. Amer. med. Ass.*, **165**, 1114.

The authors believe that haemangiomas should be treated as early as possible if the best cosmetic result is to be obtained. They report an analysis of the records of 1113 patients with the diagnosis of angioma. There were 329 patients with haemangioma simplex : 102 of 153 who received no treatment could be followed up and in 63% of them the lesions had involuted or improved within 5 years. Of those involuting spontaneously 83% were 1 cm. or less in diameter. Of 135 patients with cavernous haemangioma who received no treatment and could be followed, 84% showed persistence of the lesion for more than 5 years. A. J. R.

GRANULOMATOUS REACTIONS TO DEODORANT STICKS. C. Sheard, F. E. Cormia, S. C. Atkinson and E. L. Worthington. (1957) *J. Amer. med. Ass.*, **164**, 1085.

Nodular and papular lesions in the axillae of three women and one man proved on biopsy to have a granulomatous structure containing epithelioid and giant cells. All the patients had been using a deodorant stick containing sodium zirconium lactate, which was the only new ingredient and is assumed to be the cause of the reactions. A. J. R.

CUTANEOUS LEISHMANIASIS—CONFUSION WITH HISTOPLASMOSIS. Z.-P. Woc and H. A. Reimann. (1957) *J. Amer. med. Ass.*, **164**, 1092.

Report of a case of dermal leishmaniasis, presenting as a nodular lesion of the chin. The differentiation from other granulomas, particularly histoplasmosis, is described. A. J. R.

INTESTINAL POLYPOSIS AND PIGMENTED SPOTS OF LIPS. L. C. Rohrs. (1957) *J. Amer. med. Ass.*, **165**, 208.

A man aged 22 had polyps of the duodenum, jejunum, ileum and ascending and sigmoid colon associated with pigmented spots of the lips, and perioral skin. The were two attacks of intussusception. Two of the polyps removed were malignant. The pigmented spots may also occur on the fingers and toes, around the eyes and on the nose; they are usually present from infancy. Most patients develop repeated bouts of abdominal pain from the second decade. A. J. R.

PENICILLINASE IN THE TREATMENT OF PENICILLIN REACTIONS. A. M. Minno and G. M. Davis. (1957) *J. Amer. med. Ass.*, **165**, 222.

Circulating penicillinase rapidly reduces blood penicillin levels to zero for prolonged periods. An intramuscular injection of one million units of penicillinase was employed in the treatment of 52 patients with penicillin reactions. Although the response was variable some patients experienced dramatic relief within a few hours. Two patients with severe serum-sickness type reaction responded promptly after they had failed to improve with steroids or antihistamines. Pain and tenderness at the injection site were the only side effects. A. J. R.

REDUCTION IN ELEVATED BLOOD CHOLESTEROL LEVELS BY LARGE DOSES OF NICOTINIC ACID. W. B. Parsons and J. H. Flinn. (1957) *J. Amer. med. Ass.*, **165**, 234.

Oral nicotinic acid in doses of 3–6 g. daily produced a significant reduction of blood cholesterol levels in 16 of 24 patients with hypercholesteraemia. Nicotinamide was ineffective. No serious side effects were observed. Flushing and pruritus subsided after the first week of treatment in nearly all cases. The mechanism by which nicotinic acid reduces blood cholesterol levels is obscure. A. J. R.

HYDRALAZINE SYNDROME—HYPERSENSITIVITY OR TOXICITY? H. Reynolds and J. R. Caldwell. (1957) *J. Amer. med. Ass.*, **165**, 1823.

A woman aged 39 developed a syndrome resembling acute rheumatoid arthritis after receiving small doses of hydralazine for only a short period. Reviewing the reported cases of reactions to this drug simulating lupus erythematosus or rheumatoid arthritis the authors conclude that the weight of the evidence is against hypersensitivity as the underlying mechanism. Hydralazine will produce a syndrome apparently identical with lupus erythematosus in the experimental animal, and this should offer great opportunities for research into the collagen diseases. A. J. R.

USE OF A NEW CORTICOSTEROID (ARISTOCORT DIACETATE) IN DERMATOLOGY. C. R. Rein, R. Fleischmajer and A. L. Rosenthal. (1957) *J. Amer. med. Ass.*, **165**, 1821.

Aristocort is a new synthetic corticosteroid. In 26 patients with severe dermatoses it proved to have potent anti-inflammatory and anti-pruritic properties and to be more active than prednisolone. Although there were no significant side-effects in this short series of cases the period of observation was too short for proper evaluation of the new compound. A. J. R.

SEVERE IMMEDIATE REACTIONS TO BIOLOGICALS CAUSED BY SILK ALLERGY. S. F. Brown and M. Coleman. (1957) *J. Amer. med. Ass.*, **165**, 2178.

Three children developed severe immediate reactions after the injection of an immunizing agent: tetanus toxoid, triple antigen, human gamma globulin or typhoid-paratyphoid vaccine. The patients were proved by direct or passive transfer tests to be allergic to silk. During the filtration of biological products through silk membranes sufficient contamination with silk may occur to be antigenically effective. A. J. R.

METHYLPREDNISOLONE (MEDROL), A POTENT NEW ANTI-INFLAMMATORY STEROID. S. M. Feinberg, A. R. Feinberg, J. Pruzansky and E. W. Fisherman. (1957) *J. Amer. med. Ass.*, **165**, 1560.

Methylprednisolone (Medrol) was administered to 56 patients with asthma, hay fever and dermatitis for periods of 1–22 weeks. The clinical efficacy and side effects were approximately equivalent to those of prednisone. A. J. R.

MILK ALLERGY—DIAGNOSTIC ASPECTS AND THE ROLE OF MILK SUBSTITUTES. J. H. Fries. (1957) *J. Amer. med. Ass.*, **165**, 1542.

Cow's milk may cause gastrointestinal and other symptoms which have no allergic basis. Among the author's patients 5% attributed symptoms to cow's milk but only 0·3% were considered to be allergic to milk. The antigen is usually lactalbumin which can be denatured by boiling. Occasionally all bovine products have to be avoided. The hazards of various milk substitutes are described. Since infants may lose their sensitivity to cow's milk it should be retried at intervals. A. J. R.

THALLOTOXICOSIS—A RECURRING PROBLEM. REPORT TO THE COUNCIL ON DRUGS OF THE AMERICAN MEDICAL ASSOCIATION. (1957) *J. Amer. med. Ass.*, **165**, 1566.

Thallium sulphate is used as a poison for rodents and cockroaches, and may be accidentally swallowed by children. In acute poisoning symptoms develop after a few hours or may be delayed for as much as two days. Digestive and vasomotor disturbances are followed by muscular weakness, delirium, convulsions and coma. In chronic poisoning milder symptoms of the same types may be associated with neurological manifestations and with epilation, the latter appearing in the first 10–14 days of the illness. A. J. R.

ECZEMATOUS COMPLICATIONS IN TREATMENT OF TUBERCULOSIS. J. T. Crissey, E. D. Osborne and J. W. Jordon. (1957) *J. Amer. med. Ass.*, **165**, 1526.

Patients receiving various combinations of isoniazid, dihydrostreptomycin and aminosalicylic acid for tuberculosis may develop eczematous eruptions resembling seborrhoeic dermatitis, nummular eczema or both. The prolonged observation of 37 such cases suggested that aminosalicylic acid is the chief cause and that dihydrostreptomycin can occasionally be incriminated. Possibly a disturbance of the normal bacteriological flora of the skin is responsible for the eruptions. A. J. R.

STUDIES ON THE QUANTITY OF RADIATION REACHING THE GONADAL AREAS DURING DERMATOLOGIC X-RAY THERAPY. V. H. Witten, M. B. Sulzberger and W. D. Stewart. (1957) *J. invest. Derm.*, **28**, 187.

An electrostatic dosimeter was placed on the epigastrium of some female patients, and in the crutch of males, while they received X-ray treatment for acne, axillary hidradenitis, psoriasis, warts, nail dystrophies and the like according to customary dermatological office routine. The gonadal dose in these circumstances, derived exclusively from scatter, varied between 2 and 200 milliröntgens.

J. H. T. D.

THE EFFECT OF SUBSTITUTED NAPHTHALENES ON THE PILOSEBACEOUS APPARATUS OF RABBIT AND MAN. G. W. Hambrick. (1957) *J. invest. Derm.*, **28**, 89.

Of many substituted naphthalene compounds only Halowax 1014 and hexachloronaphthalene produced experimental chloracne. The others if strong enough produced inflammation but without specific lesions. Moderate concentrations of the highly chlorinated naphthalenes that are relatively insoluble serve as a constant stimulus to the epithelium of the external root sheath and sebaceous gland ducts. Differentiation of the epithelium into squamous cells proceeds rapidly. Once the sebaceous cells already formed have served their holocrine role they cannot be replaced, so the sebaceous gland atrophies. Neither Vit. A, testosterone, estrogen, nor cortisone has any effect on the process.

J. H. T. D.

RESPONSES OF THE SECRETORY COIL OF THE HUMAN ECCRINE SWEAT GLAND TO CONTROLLED INJURY. W. C. Lobitz. (1957) *J. invest. Derm.*, **28**, 105.

The diagram shows a disc of skin removed to such a depth that the coil gland is injured but not destroyed ; but it is not made clear how the deep surface of the plug to be removed is accurately sliced off.

Nevertheless there was to be found in subsequent biopsy specimens satisfactory evidence that the cells of the secretory coil have the potency to make new secretory cells, basal and luminal cells of the sweat duct, a spiralling " epidermal sweat duct unit " and mature epidermal prickle cells both inside and outside the coil.

J. H. T. D.

QUANTITATIVE AND QUALITATIVE DATA ON THE PIGMENT CELLS OF ADULT HUMAN EPIDERMIS. R. J. Staricco and H. Pinkus. (1957) *J. invest. Derm.*, **28**, 33.

To count the melanocytes in a given area of skin the epidermis should be separated by means of sodium bromide which does not interfere with the dopa reaction. The numbers vary from 400 to 2750 per square millimetre and have wide individual variation. Mean values are : for front of trunk 800, lower extremities 1050, back head neck and upper extremities 1300, and genitals 1650.

It is not known how the pigment granules found in the malpighian cells get there ; but phagocytosis by the basal cells of pigment discharged by melanocytes is suggested. In support of this it is pointed out that after treatment with thorium-X when the malpighian cells refuse to accept the pigment, it reaches the horny layer through the intercellular spaces.

J. H. T. D.

THE TRANSPORT OF WATER THROUGH THE HUMAN EPIDERMIS. J. W. Mali. (1956) *J. invest. Derm.*, **27**, 451.

A comprehensive, not to say exhaustive, account which must surely become standard reading for all interested in this complicated subject, one evidently much more vital for fishes than for mankind.

The general idea is that neither horny layer nor rete would oppose the passage of water in either direction ; but that there is a barrier zone which can actually be isolated—for example by macerating epidermis in dilute aqueous methylene blue and scraping till white. This barrier zone either by virtue of its molecular structure, cellular arrangement, intercellular lipoid or other material, is readily permeable only to the extent by which it is perforated by appendages. Thus the substantial plantar membrane, though its sweat pores may be occluded to some extent by the molecular changes in their lining due to low relative humidity, is not so suitable for *in vitro* studies as the more delicate membrane of the back ; though for practical purposes the rest of the epidermis can be ignored.

The process of diffusion whether gaseous or otherwise is believed not to be simple, but one bound up with the constant molecular movement taking place in polymeric protein in response to changing conditions of humidity and temperature.

J. H. T. D.

HUMAN MELANOCYTES IN TISSUE CULTURE. Funan Hu, R. J. Staricco, H. Pinkus and R. P. Fosnaugh. (1957) *J. invest. Derm.*, **28**, 15.

The material was derived from prepuces black and white, and from intradermal or compound benign pigmented naevi, and it was cultivated by the roller tube technique.

The results indicate that the epidermis is a compound tissue composed of at least two distinct cellular elements, the dendritic cells and the ordinary epithelial cells, each self-sufficient and capable of maintaining themselves in constant numbers in the epidermis. These are the same for black and white; individual cells in negroes produce more pigment. By melanocyte is understood a cell that either gives a positive dopa reaction or can be shown to contain argentaffin granules.

Melanin granules are to be found in ordinary epithelial cells and in fibrocytes. Phagocytosis is frequent in tissue culture. The cells of the intradermal part of cellular naevi do not proliferate in tissue culture. There appeared to be differences in size and in other respects between melanocytes derived from normal skin and those from the epithelial part of pigmented naevi.

J. H. T. D.

DISRUPTION OF EPITHELIAL CELLS BY HEAT AND SPECIFIC CHEMICAL AGENTS. R. B. Stoughton. (1956) *J. invest. Derm.*, **27**, 395.

This is primarily a histological study of the changes seen in skin at intervals—5 minutes to 24 hours—after a mild thermal burn at 60° C. for 30″.

Comparison is drawn with the acantholytic effect of LiBr and urea, which might be supposed to act by dissolution of disulphide linkages in the tonofibrils, of which the substance is supposed to be chemically related to keratin. Not only these agents but also cysteine and glutathione attack alimentary and respiratory epithelia—in which tonofibrils have never been described. Liver pancreas and heart muscle are unaffected.

(This paper may be of far-reaching importance because urea is widely used as a direct source of nitrogen in feeding stock. It would also seem to have possibilities in the preparation of delicacies for invalids!) J. H. T. D.

TREATMENT OF APHTHOUS ULCERATION OF THE MOUTH. S. C. Truelove and R. M. Morris-Owen. (1958) *Brit. med. J.*, 603.

Aphthous ulceration of the mouth in 52 patients was treated with hydrocortisone hemisuccinate tablets held in the mouth. Four tablets a day represented a dose of 10 mg. of hydrocortisone. Improvement occurred but the trial was not controlled. S. T. A.

HIDRADENITIS SUPPURATIVA. T. Benedek. (1957) *Acta derm.-venereol., Stockh., Supp.* 37.

A full review of the subject with excellent references.

The author believes that hidradenitis suppurativa (like psoriasis, pityriasis rosea, seborrhoeic dermatitis and pompholyx) is caused by the " *Bacillus endoparasiticus* Benedek ". This organism he has grown from material aspirated from unruptured lesions. Furthermore, " specific vaccine treatment ", usually 2 to 6 injections, will cure most cases. It may be necessary to combine this with large doses of vitamin A by mouth.

The *B. endoparasiticus* Benedek, first described by the author in 1927, is not recognized in standard British and American text-books of bacteriology.

No bacteriological or statistical evidence is produced to support this thesis. O. L. S. S.

CURRENT THERAPEUTICS—BARRIER CREAMS. I. B. Sneddon. (1958) *Practitioner*, **239**, 180.

The true value of barrier creams is still debatable, but their main virtue is that they enable the skin to be cleansed more easily after a day's work. There is at present no adequate protection against prolonged immersion in alkaline solutions or industrial solvents, and no effective all-purpose ointment has yet been devised. Occasionally barrier creams themselves cause dermatitis, particularly when worn beneath gloves; they may even facilitate the penetration of noxious substances into the deeper layers of the skin. It is important that a barrier cream be carefully selected for the particular purpose for which it is intended.

Silicone barrier creams have been recommended for the prevention of napkin rashes, skin around colostomy openings and for the prevention of bedsores.

Light-barrier creams are useful in cases of actinic dermatitis, chronic discoid lupus erythematosus and xeroderma pigmentosum. R. J. C.

AN INVESTIGATION OF PORPHYRIA CUTANEA TARDA. G. Holti, C. Rimington, B. C. Tate and G. Thomas. (1958) *Quart. J. Med.*, n.s., **27**, 1.

A family showing transmission of porphyria cutanea tarda as a Mendelian dominant through four generations is presented, together with a special study of its most severely affected member.

This patient had constipation from early childhood and has had attacks of severe abdominal colic, anorexia, nausea, giddiness, postural hypotension, peripheral neuropathy and headaches. Her general health has been much impaired since pregnancy and her skin lesions appeared one hour after delivery. There has been obvious fragility of skin habitually exposed to sunlight but no direct light sensitivity.

Urinary porphyrins, often increased, were occasionally within normal limits. Faecal porphyrins were consistently in excess of normal.

Fifteen members of the family were examined for faecal and urinary porphyrins. With one exception the urine specimens examined contained only normal quantities, but faecal porphyrins in excess of normal were found in ten specimens. Only one of these subjects was light sensitive, six had undue fragility of exposed skin, three had not had any skin lesions, nine had had gastro-intestinal or neurological symptoms and all were in poor general health. J. M. B.

TREATMENT OF CANCER OF THE TONGUE AT HARTFORD HOSPITAL, 1931–52. N. W. Wawro and A. Babcock. (1953) *New. Engl. J. Med.*, **258**, 317.

The most likely cause of a persistent unilateral lesion in the mouth is cancer, even when the W.R. is positive, and the commonest early symptoms in 128 patients were soreness, pain and swelling of the tongue.

Lesions of the anterior half of the tongue can be treated either surgically or by radiation, while those on the posterior half should be irradiated.

If lymph glands are affected, radical monoblock resection is required. A. D. P.

VACCINIA OF THE LIP. S. Kilrick and L. J. Kunz. (1958) *New. Engl. J. Med.*, **258**, 421.

Two patients with vaccinia of the lip are described. A. D. P.

BACTERIAL VARIATIONS IN THE NASOPHARYNX AND SKIN OF ISOLATED ARCTIC SCIENTISTS. R. W. Christie. (1958) *New Engl. J. Med.*, **258**, 531.

The changes in the bacteria of the nasopharynx and skin were noted in six men isolated for a hundred days on the Greenland ice cap.

On the skin bacillus subtilis and staphylococci became widely established, while other organisms disappeared. Avoidance of washing did no harm. A. D. P.

PLANTAR WARTS. R. P. Warin. (1958) *Practitioner*, **371**, 180.

The aetiology, diagnosis and treatment of plantar warts are discussed. Therapeutic measures include suggestion, formalin soaks, occlusive strapping and chemical destruction, as well as freezing, surgical removal and radiotherapy. R. J. C.

CONGENITAL DYSKERATOSIS (ZINSSER-COLE-ENGMAN TYPE) ASSOCIATED WITH A CONSTITUTIONAL MYELOPATHY (THROMBOPENIC AND NEUTROPENIC PURPURA). A. Bazex and A. Dupre. (1957) *Ann. Derm. Syph., Paris*, **84**, 497.

This syndrome is characterized by reticular pigmentation, buccal leukoplakia and ungual dystrophy. It affects only males and is inherited as a recessive. The first signs appear between five and twelve years of age. There may also be hyperidrosis, acrocyanosis, bullae, keratoses etc. The patient described here also presented an aplastic change in the bone marrow. F. F. H.

RELAPSING ABACTERIAL THORACIC PUSTULOSIS : DUHRING'S DISEASE, SNEDDON-WILKINSON'S DISEASE. B. Duperrat. (1957) *Ann. Derm. Syph., Paris*, **84**, 514.

An extensive and typical example is described with excellent pictures in a woman aged forty-one, and the differential diagnosis discussed. (But please note Duhring was an American and not Dühring.) F. F. H.

CONFLUENT AND RETICULAR PAPILLOMATOSIS AND SHINY PARAKERATOSIS (PARAKERATOSE BRILLIANTE). P. Popchristov and St. Kapnilov (Sofia). (1957) *Ann. Derm. Syph., Paris,* **84**, 523.

These two conditions were first described by Gougerot who considered them separate entities. The authors describe a series of cases and state that they have never seen a case of the former unaccompanied by signs of the latter, though the reverse often occurs. They believe the two conditions should be re-united under a common heading. F. F. H.

"DERMATOLOGY: CINDERELLA OR PRINCESS?" L. W. Linn. (1956) *Austral. J. Derm.*, **3**, 109.

A plea for better recognition of the importance of dermatology. The author suggests that dermatologists should mix more with general physicians, and emphasizes the value of dermatology in the undergraduate curriculum. R. E. B.

EXFOLIATIVE DERMATITIS ASSOCIATED WITH CARCINOMA OF THE LUNG. B. McGaw and V. J. McGovern. (1956) *Austral. J. Derm.*, **3**, 115.

A report of three patients, with the autopsy findings in two of them. It was possible to remove the growth from the third patient, and his dermatosis cleared completely soon afterwards. R. E. B.

SYMPOSIUM ON ECZEMATOUS ERUPTIONS OF THE HAND. (1956) *Austral. J. Derm.*, **3**, 120–35.

(1) Clinical Features.—N. J. Wilkins.
(2) Aetiological Aspects.—W. W. Lempriere.
(3) Problems and Principles of Management.—I. O. Stahle.

The first two papers summarize the modern views on this very difficult subject. The third is a very readable and practical dissertation emphasizing what can be done, what medicaments are useless or harmful, the pitfalls in history-taking and diagnosis, and the importance of psychological factors. R. E. B.

THE ANTIBODIES IN THE SERUM FRACTIONS SEPARATED BY FLUSSOPHORESIS DURING THE COURSE OF HUMAN AND EXPERIMENTAL SYPHILIS. F. Ottolenghi-Lodigiani. (1957) *Giorn. ital. Derm.*, **98**, 501.

In this introductory paper the author describes in general the technique of continuous electrophoresis, a spectro-photometric method of estimating the proteins, and the conservation of the protein fractions by lyophilization. He suggests that the method deserves a wider field of application. A. L.

RESEARCH ON SUCCINIC DEHYDROGENASE ACTIVITY IN THE SKIN. M. Binazzi. (1957) *Giorn. ital. Derm.*, **98**, 509.

An histochemical investigation showed little variation with the site from which the skin was taken, the age of the patient or the presence of diabetes mellitus. In pemphigus (4 cases) the activity was reduced while in dermatitis herpetiformis (1 case) it was increased. The external application of vitamin A increased the activity while the application of linoleic acid, tar, colchicine, hydrocortisone and mercury reduced it. A. L.

OBSERVATIONS ON CONGENITAL ECTODERMAL DEFECT. L. Datovo and L. Levi. (1957) *Giorn. ital. Derm.*, **98**, 526.

A man aged 30, who was bald and whose nails were dystrophic, suffered from a sweat retention syndrome. There were keratin plugs in sweat pores and follicles but the sweat glands worked. His mother and father were first cousins; he was an only child. A. L.

A STUDY OF THE CONSTITUTIONAL ASYMMETRY OF HUMAN HAIR BY MEANS OF POLARIZED LIGHT. M. P. Bonanni. (1957) *Giorn. ital. Derm.*, **98**, 536.

An asymmetry was observed which was due to the bends in some of the hairs. A. L.

FURTHER OBSERVATIONS ON MACROCHEILITIS GRANULOMATOSA WITH PARTICULAR REFERENCE TO ITS RELATIONSHIP WITH THE MELKERSSON-ROSENTHAL SYNDROME. G. Pezzarossa. (1957) *Giorn. ital. Derm.*, **98**, 545.

Treatment of the patient's dental sepsis resulted in his lip regaining its normal size and appearance. The adjective granulomatosa refers to the histopathology. The giant cells observed were of the Langhans type but the overall pattern of reaction was not tuberculous. Macrocheilitis granulomatosa is due to the spread of dental sepsis to the lip as compared with the Melkersson-Rosenthal syndrome (E. Luscher (1949) *Schweiz. med. Wschr.*, **79**, 1) which is a trophoedema accompanying facial palsy. A. L.

A COMPARATIVE INVESTIGATION OF THE THERAPEUTIC ACTION OF ULTRA-SOFT, SOFT AND SEMI-HARD RAYS FOR SUPERFICIAL RADIOTHERAPY. A. R. Cofano. (1957) *Giorn. ital. Derm.*, **98**, 559.

There was no obvious difference in therapeutic effect. A. L.

ON THE PATHOGENESIS AND TREATMENT OF TUBERCULOSIS SUBCUTANEA FISTULOSA. N. Simon. (1958) *Derm. Wschr.*, **137**, 146.

After reviewing the literature the author reports a case of this uncommon condition affecting the perineal region. The diagnosis was confirmed by a culture of the organism. There was excellent response to combined INH-PAS therapy with some streptomycin in addition. Contrast radiography did however reveal the persistence of fistulae. Differential diagnosis is from actinomycosis and blastomycosis as well as acne colliquativa. The condition arises either through direct extension from the rectum or by lympho-haematogenous spread. W. G. T.

ON THE AETIOLOGY OF SARCOIDOSIS (MORBUS BOECK). M. Schomerus. (1958) *Derm. Wschr.*, **137**, 169.

This is an analysis of 235 autopsy reports in the literature. The cases are arranged into 3 groups: Those showing evidence of sarcoidosis only, those which showed sarcoidosis as well as insignificant tuberculous manifestations, and those which showed the latter only with a history of sarcoidosis. The first group is by far the largest, comprising 171 cases, the second 55 and the last only 9.

One hundred and sixty-five cases of the first group were analysed according to organs affected. The disease was found most commonly in lymph nodes, lungs, liver, spleen and myocardium.

Myocardial lesions are more common in Boeck's sarcoid than in tuberculosis, whereas kidneys, adrenals and male gonads are more commonly involved in the latter condition.

The tuberculous aetiology of Boeck's sarcoid could be proved only by demonstrating tubercle bacilli. This was possible in only 5 of 171 cases.

The greater susceptibility of the North American negro to sarcoidosis is stressed. The course of the disease is less chronic in this race and the autopsy material is 55% of the total, compared with a population ratio of about 10%. W. G. T.

DERMOEPIDERMITIS TOXICO-ALLERGICA GESTATIONIS. L. Szegö and F. Gerlei. (1958) *Derm. Wschr.*, **137**, 199.

In comparison with other toxicoses of pregnancy dermatoses have not been considered very extensively in the literature. After discussing the internal secretory, metabolic and vascular changes during pregnancy the authors report three cases of a toxic dermatosis in pregnant women. The lesions which are of varying sizes, from that of a palm to a sixpence, and are violaceous in colour with a raised bright red edge, are found on the lower trunk and thighs. There was some scaling and occasional weeping. Eosinophil infiltration was found in 2 cases, but absence of eosinophils in the third is not considered to be an argument against allergic origin.

In one patient the eruption had occurred in a previous pregnancy. In two the rash disappeared during the puerperium, but in the third recovery was delayed for 6 months by thyrotoxicosis and chronic gastroenteritis. W. G. T.

DERMATITIS MEDICAMENTOSA IN THE REGION OF HEAD'S ZONES. H. Fischer and I. Käppel. (1957) *Derm. Wschr.*, **136**, 875.

Exacerbation of an iodine dermatitis in the appropriate Head's zones during attacks of appendicitis and renal colic. Contrast radiography of the renal tract did not produce a relapse. W. G. T.

TREATMENT OF ONYCHOMYCOSES BY REMOVAL OF THE NAIL WITH THE AID OF HYALURONIDASE. E. Neumann. (1957) *Derm. Wschr.*, **136**, 746.

Infected nails were removed under local anaesthesia and after subungual injection of 1 c.c. of hyaluronidase. After removal of hyperkeratotic material an iodo-urotropin ointment was applied to the nail bed. In 16 cases 116 nails were removed and cure took place in 50% of finger-nails and 84% of toe-nails. W. G. T.

EXACERBATION OF PSORIASIS IN PREGNANCY. L. Nardelli. (1957) *Derm. Wschr.*, **136**, 748.

Improvement and healing of psoriasis during pregnancy is well known and occurs in almost 50% of cases. In about 15% of cases deterioration is observed. This occurrence is pathognomonic of some pathological process in the patient. The author mentions such conditions as liver and gall-bladder disease, malnutrition, heavy manual work, salpingitis, foetal death and psychological trauma as causes responsible for exacerbations. W. G. T.

CONTRIBUTION TO THE QUESTION OF THE AETIOLOGY OF ACTINIC TRAUMATIC BULLOUS PORPHYRIN DERMATOSES. H. Elscher and R. Andrade. (1958) *Derm. Wschr.*, **137**, 114.

The authors review the literature and 11 of their own cases from the aetiological point of view. Though chronic alcoholism has been frequently quoted as a cause of this condition the importance of syphilis and its treatment with heavy metals has been neglected. This latter factor occurs sufficiently often both in the literature and in the authors' own cases to warrant attention. W. G. T.

A PECULIAR NODULE FORMATION IN ACRODERMATITIS CHRONICA ATROPHICANS (NEURINOMA). R. Frühwald. (1958) *Derm. Wschr.*, **137**, 117.

Nodule formation in acrodermatitis chronica atrophicans has been reported on a number of occasions. These lesions usually proved to be lymphocytomata, though a lymphosarcoma has been reported by Jordan and Götz. The author's case proved to be a neurinoma and he does not consider that there is any connection between the acrodermatitis and the nodule formation on this occasion. W. G. T.

HISTOLOGICAL AND HISTOCHEMICAL INVESTIGATION OF A SPECIAL CASE OF INTRA-EPIDERMAL EPITHELIOMA. R. Andrade. (1958) *Derm. Wschr.*, **137**, 120.

Detailed histological description of a slow-growing tumour of the foot occurring in a woman aged 54. Though reminiscent of the Borst-Jadassohn tumour this case showed peculiarities which necessitated differentiation from naevus pigmentosus, malignant melanoma and eccrine poroma. The author is not prepared to make a definite classification at the present moment. W. G. T.

A MISTAKEN DIAGNOSIS IN JUVENILE MELANOMA. K. Wellmer. (1958) *Derm. Wschr.*, **138**, 128.

A tumour of the face had been diagnosed clinically as tuberculosis cutis luposa. Investigations for tuberculosis were negative. The tumour was excised and showed the histology of juvenile melanoma. W. G. T.

ALEUKAEMIC LYMPHADENOSIS PRESENTING AS ACRODERMATITIS CHRONICA ATROPHICANS. W. Schneider and H. Wagner. (1957) *Derm. Wschr.*, **136**, 1279.

Skin manifestations in the various forms of leukaemia are well known though rare. Some manifestations are specific, others non-specific. Between 1929 and 1949 111 cases have been reported in the literature in leukaemic conditions and only 12 in aleukaemic ones.

A woman aged 64 had been suffering for 7 years from a skin condition indistinguishable from acrodermatitis atrophicans. Glands were not involved and the blood picture and sternal puncture did not allow a diagnosis of leukaemia. Histological examination of a piece of atrophic skin from the knee showed the typical picture of lymphatic leukaemia. Response to X-ray therapy is an additional point in favour of the diagnosis. W. G. T.

PSORIASIS PUSTULOSA (TYPE ZUMBUSCH). H. J. Schuppener and G. Kober. (1957) *Derm. Wschr.*, **136**, 953.

Pustular psoriasis of this type is an extremely acute psoriatic reaction and the expression of a particular phase of lability in the course of a case of psoriasis.

In the past it has been considered to be an infectious manifestation or one of focal sepsis. Though this may be true in the Barber variety of pustular psoriasis Zumbusch himself has always denied such origin.

It is considered that these extreme exacerbations are a stress manifestation due to mental and physical trauma and not at all infrequently to drugs. Arsenic, neosalvarsan, antistin and chloroquin, topical penicillin and possible rimifon have been known to cause this reaction. In two cases described by the authors in detail arsenic, cignolin, atebrin, transfusions and sunlight were experienced to be stress factors. Depending on the nature of this stress factor elimination of focal sepsis, penicillin and broad spectrum antibiotics, and ACTH and cortisone have been found to be effective therapeutic measures. Premature cessation of steroid therapy leads to severe exacerbations. W. G. T.

THE TREATMENT OF CHRONIC VEGETATING PYODERMIAS WITH POTASSIUM PERMANGANATE. W. Leipold. (1957) *Derm. Wschr.*, **136**, 949.

This condition has to be distinguished from pyoderma vegetans (Hallopeau) and is a clinical variant of pemphigus vegetans. Usually one lesion only is present on the dorsum of the hand, the lower leg and often on amputation stumps. The appearances can simulate an epithelioma, sporotrichosis, bromoderma, iododerma and tuberculosis verrucosa cutis. Diagnosis has to be based on bacteriological and histological considerations.

Treatment with potassium permanganate crystals has been used previously in chronic ulcers of the skin and plantar warts but not so far in vegetating pyodermias.

The powdered crystals are applied to the lesion which is isolated for protection from the surrounding skin by application of a zinc paste.

Dressings are renewed every day or every other day and healing takes place in 10 to 30 days leaving a smooth scar. W. G. T.

TREATMENT OF CONDYLOMATA ACUMINATA WITH COLCHICINE. G. Wiedemann. (1957) *Derm. Wschr.*, **136**, 1105.

He advocates treating these lesions with colchicine. One to 3% ointments and a 1% powder were used in 50 cases, 38 of which cleared, the other 12 requiring additional surgical treatment. W. G. T.

FIXED CHRONIC RECURRING ERYTHEMA. R. Wernsdörfer. (1957) *Derm. Wschr.*, **136**, 1100.

This condition has to be distinguished from fixed drug eruptions and Gougerot's fixed autotoxic erythema. Ten cases were observed. There was usually one lesion, occasionally two or three, which consisted of erythema only without pigmentation. The course of each attack was 5–12 days. Recurrences happened over periods of 9 months to 4 years. Drugs were excluded as aetiological factors. The lesions always occurred in the same place but there was no typical localization. All responded to autohaemotherapy. W. G. T.

EOSINOPHILIC LEUKAEMOID PRESENTING AS A BULLOUS DERMATOSIS. W. Schöldgen. (1957) *Derm. Wschr.*, **136**, 1009.

Skin manifestations as the first sign of leukaemic processes have been reported frequently. Eosinophilic leukaemoid is a condition in which there is an increase of eosinophils without involvement of the lymph nodes or spleen.

The case described presented as a generalized vesicular and pustular dermatosis with a leukocytosis of 11,500 of which 50% were eosinophils. It was subsequently discovered that this eosinophilia was present without skin manifestations 5 years previously and it remained constant subsequently. W. G. T.

ON THE PATHOGENESIS OF COLD URTICARIA. G. Brehm. (1957) *Derm. Wschr.*, **136**, 1020.

Three cases of cold urticaria were investigated. It was found that static cold as produced by the application of ice resulted in urticaria at very much lower temperatures than cold air blown on the skin. It is assumed therefore that the mechanical action of the wind is of some importance in producing cold urticaria. W. G. T.

GRANULOMATA AND FISTULAE CAUSED BY HAIR. H. Röckl and E. Müller. (1957) *Derm. Wschr.*, **136**, 912.

Report of a granuloma in the skin of an interdigital cleft of a barber's hand. The condition was due to implantation of a piece of hair. The condition also occurs in milkers and butchers and has to be accepted as an occupational dermatosis. W. G. T.

POLYMORPHOUS LIGHT ERUPTION. SOME UNUSUAL REACTIONS IN ULTRAVIOLET LIGHT TEST SITES. E. J. Levy, M. M. Cahn and B. Shaffer. (1957) *J. invest. Derm.*, **28**, 147.

The normal reaction of the skin to ultraviolet light of 2900–3200 Å is erythema followed by pigmentation. The erythema begins between 4 and 6 hours after exposure, reaches maximum intensity in 24–48 hours by which time pigmentation has also begun to appear. It is generally accepted that something other than histamine released by the damaged epidermal cells affects the vessels.

In the subjects of polymorphous light eruption a further wave of erythema reaches its peak between 48 and 96 hours after exposure and remains at maximum intensity for 7–10 days. However in 2 of the cases here reported it persisted for several months. There was no additional pigmentary reaction, but in certain cases papules developed and in 2 of the authors' cases there was a recrudescence of papules on sites that had been the subject of earlier experiments. Though chloroquin has no effect on the persistent erythema here described for the first time, it does suppress both the delayed erythema and the papular reaction which the authors lump together and call the " photoallergic response ".

Since the part of the spectrum responsible for both normal erythema and photoallergic response is below 3100 Å while the absorption peak for chloroquin is above that point, its protective action is clearly not that of a simple sun screen. J. H. T. D.

THE ROLE OF SAPROPHYTIC FUNGI IN THE PRODUCTION OF ECZEMATOUS DERMATITIS. I. THE LOCATION OF FUNGI WITHIN HUMAN NAILS. O. F. Jillson and E. L Piper (1957) *J. invest Derm.*, **28**, 137.

Has the presence of fungi growing within the nail-plate any influence on ringworm infection in other parts of the skin or perhaps on an eczema that might conceivably be attributed to inhalation of moulds ? Allergy to living microbes differs from allergy to pulverized microbes and extracts. Does it make any difference whether the fungi are growing in the distal part of the nail or near the matrix ? In an attempt to answer these questions the authors have begun by zoning the nail-plate according to its histochemistry and show that *T. rubrum* and saprophytes elect different parts of the nail to grow in. J. H. T. D.

AN EXPERIMENTAL STUDY OF THE EFFECTS OF SUBCUTANEOUS IMPLANTATION OF ANDROGENS AND ESTROGENS ON HUMAN SKIN. W. B. Shelley and H. J. Hurley. (1957) *J. invest. Derm.*, **28**, 155.

In 27 males between 20 and 45 years old a pellet of progynon was implanted quite superficially in the skin of one axilla and either nothing at all or a pellet of testosterone in the other. Gynaecomastia developed in about 4 months in either case but without any functional or structural change in apocrine glands or other appendages even where they were in close contact with the pellet. The action of sex hormones on the skin is evidently not a direct one.

J. H. T. D.

THE EFFECT OF ANTIBIOTIC THERAPY UPON ENTERIC BACTERIA IN ACNE VULGARIS. D. E. Loveman and R. O. Noojin. (1957) *J. invest. Derm.*, **28**, 183.

Eight girls and 2 boys seeking treatment for acne were each given by mouth the antibiotic that appeared to have the greatest *in vitro* effect on the microbe—presumably some sort of staphylococcus, but it does not say. In all cases the " pustular phase " of the acne was improved and in 9 the rectal flora altered.

" With these data it cannot be stated whether or not these changes in the bacterial flora significantly influenced the patients' clinical improvement." J. H. T. D.

EXPERIMENTAL CONTACT DERMATITIS. II. CONTACT DERMATITIS IN GUINEA-PIGS INDUCED BY PARAPHENYLENE DIAMINE AND RELATED COMPOUNDS. I. Zeligman. (1957) *J. invest. Derm.*, 28, 121.

The author evidently still feels that it is worth while to study contact allergy in the guinea-pig in spite of the great anatomical differences between animal and human skin and the too-often equivocal reactions of both. He considers that if 50% carbowax 1500 is used as the vehicle, paraphenylene diamine is a suitable allergen and that he is able to draw useful conclusions from work so far completed. J. H. T. D.

CRYPTOCOCCOSIS WITH CUTANEOUS MANIFESTATIONS. FOUR CASES WITH A REVIEW OF PUBLISHED REPORTS. M. Moore. (1957) *J. invest. Derm.*, 28, 159.

This review covers 37 reported cases. There is no characteristic cutaneous lesion. Nondescript ulcers, abscesses, sinuses, furunculoid and acneiform lesions are described and even one that appeared at first to be a basal-celled carcinoma. Cryptococci may be plentiful, or perhaps only a single one may be seen after examination of much material. The cutaneous lesion sometimes responds to X-ray treatment, but the neurological or haematological implications of the infection make the disease almost invariably lethal; and there is no useful treatment for it. Even steroids are suspected of making matters worse. J. H. T. D.

PERCUTANEOUS ABSORPTION OF CORTISONE-4-C^{14} THROUGH NORMAL HUMAN SKIN. F. D. Malkinson, E. H. Ferguson and M. C. Wang. (1957) *J. invest. Derm.*, 28, 211.

An elaborate experiment designed to show that cortisone applied as an ointment penetrates the skin just as well as hydrocortisone, from which the authors deduce that "the inefficacy of topical cortisone therapy, *in contrast to hydrocortisone*, implies formation in the skin of one or more potent anti-inflammatory metabolites specific for hydrocortisone". J. H. T. D.

AN EVALUATION OF AMPHOTERICIN B IN VITRO AND IN VIVO IN MICE AGAINST COCCIDIOIDES IMMITIS AND CANDIDA ALBICANS, AND PRELIMINARY OBSERVATIONS CONCERNING THE ADMINISTRATION OF AMPHOTERICIN B TO MAN. C. Halde, V. D. Newcomen, E. T. Wright and T. H. Sternberg. (1957) *J. invest. Derm.*, 28, 217.

This antibiotic "isolated from an unidentified species of streptomyces first obtained from the soil of the Orinoco River region of Venezuela" is said to inhibit coccidioides and candida *in vitro* and in mice, but not in men. The preparation used was a suspension of mycelial fragments introduced into the peritoneal cavity, or ingested in which case not very much of it could be detected in the serum. Should we not now search the valley of the Alph? J. H. T. D.

DEVELOPMENT OF THE BASEMENT MEMBRANE IN HUMAN SKIN. S. W. Becker and A. A. Zimmermann. (1957) *J. invest. Derm.*, 28, 195.

In the course of some work on melanocytes it was noticed that the first step in gold impregnation, treatment with formic acid and lemon juice which ordinarily detaches the epidermis, generally failed to do so with foetal skin. It was the same with pancreatin.

A basement membrane, staining selectively with Hotchkiss P.A.S., cannot be demonstrated much before the 7th foetal month and it is supposed that this structure contains the soluble link. J. H. T. D.

THE ERYTHEMA EFFECTS OF A POLONIUM PLAQUE (AN ALPHA EMITTER) ON HUMAN SKIN. V. H. Witten, W. S. Wood and R. Loevinger. (1957) *J. invest. Derm.*, 28, 199.

Polonium, though emitting only α particles, is considered dangerous enough to need a thin gold plating and furthermore to be covered with a film of plastic to avoid contamination of the skin to which it is applied. The epidermis averages 50 μ (30 μ–75 μ) in thickness and indirect measurements with plastic of similar specific gravity indicate that it cannot be penetrated by the particles. The erythema must therefore be the effect on the underlying blood vessels of some substance released by the epidermis in response to injury. Its latent period and its intensity are proportional to the dose, the minimum capable of producing a reaction being 100 kilorad (10,000,000 ergs of absorbed energy per gram). J. H. T. D.

THE SIMULTANEOUS OCCURRENCE OF URTICARIA PIGMENTOSA AND PRIMARY SYSTEMIC AMYLOIDOSIS : REPORT OF A CASE WITH AUTOPSY FINDINGS. J. G. Rukavina, G. Dickison and A. C. Curtis. (1957) *J. invest. Derm.*, 28, 243.

In support of this case report with its exhaustive commentary, it is suggested that " insufficient attention has been given to the extra-coagulative mast cell-connective tissue dichotomy at its broadest, and perhaps most important aspect". J. H. T. D.

THERAPEUTIC STUDIES ON RINGWORM INFECTED GUINEA-PIGS. R. W. Menges, L. K. Georg and R. T. Habermann. (1957) *J. invest. Derm.*, 28, 233.

Not all preparations advertised for the topical therapy of ringworm in animals are suitable for dipping the whole animal. Homely mixtures of benzoic and salicylic acid for example proved highly toxic. It appears that *T. mentagrophytes* is not for practical purposes self-limiting in guinea-pigs and that there might be a market for an effective dip even if the animals do have to be isolated and have their cages disinfected as well. J. H. T. D.

THE EFFECT OF VARYING ORAL DOSAGES OF BANTHINE, PROBANTHINE AND PRANTAL ON THE GALVANIC SKIN RESPONSE. D. J. Perry, G. E. Mount and B. W. Browne. (1957) *J. invest. Derm.*, 28, 239.

100 mg. and 50 mg. doses of Banthine registered significantly in the skin resistance meter, but the other drugs were hardly distinguishable from the placebo. J. H. T. D.

INVASION OF NAILS IN VITRO BY CERTAIN DERMATOPHYTES. F. Raubitschek and R. Maoz. (1957) *J. invest. Derm.*, 28, 261.

Dermatophytes can be persuaded to invade nail clippings *in vitro* by subjecting the broth culture containing them to continuous shaking for several weeks. But it seems doubtful if the appearances of pathogenic invasion of nail substance were at all faithfully reproduced.
J. H. T. D.

FAILURE OF SOLUBLE PREDNISOLONE HEMISUCCINATE TO INHIBIT LOCAL INFLAMMATION ON LOCAL INJECTION. L. Goldman and S. M. Barnett. (1957) *J. invest. Derm.*, 28, 269.

Though effective by the intravenous route in erythema multiforme and certain drug eruptions, this particular steroid, possibly because its solubility brings about its rapid disappearance from the site of injection, is ineffective in intradermal medication. J. T. H. D.

SULPHATES IN HUMAN SWEAT. M. G. Williams. (1957) *J. invest. Derm.*, 28, 271.

Though silver objects carried in the pockets may be blackened through ingestion of sulphur by the wearer, it is confirmed that the excretion is not by way of sulphates through the sweat.
J. H. T. D.

CHANGES IN TYROSINASE ACTIVITY DURING MELANOCYTE PROLIFERATION IN THE HAIR GROWTH CYCLE. A. Kukita. (1957) *J. invest. Derm.*, 28, 273.

The increase in tyrosinase activity during the later phases of anagen is attributed to proliferation of new cells rather than to the resumption of activity by resting melanocytes.
J. H. T. D.

SKIN DESQUAMATING MACHINE—A TOOL USEFUL IN DERMATOLOGIC RESEARCH. A. L. Lorincz. (1957) *J. invest. Derm.*, 28, 275.

and

AN IMPROVED TECHNIQUE FOR CAPILLARY MICROSCOPY OF THE SKIN. M. J. Davis and A. L. Lorincz. (1957) *J. invest. Derm.*, 28, 283.

This ingenious and impressive-looking prototype, which works on the same principle as a child's repeating cap pistol, makes it so easy to obtain a standardized Scotch-tape stripped surface that nobody could possibly resist the temptation to perform all sorts of experiments with it. Removal of the horny layer for example facilitates capillary microscopy; but the chief value lies in the opportunity of studying the function of the outer layers of the epidermis in allergy.

The removal of the water barrier reduces the patch test sensitivity threshold to nickel, chrome,

benzocaine and turpentine, but it prevents reaction to 3-*n*-pentadecylcatechol which presumably either has to combine with keratin to form an antigen or is denatured by some enzyme associated with epidermal repair processes. It also appeared, in one case, to inhibit the reaction to sun in a patient with solar urticaria. J. H. T. D.

CLINICAL AND SEROLOGICAL EVALUATION OF 6162 COMPARATIVE SLIDE TESTS WITH CARDIOLIPIN, NATURAL LECITHIN ANTIGEN AND CARDIOLIPIN, SYNTHETIC LECITHIN ANTIGEN. B. Levine, B. S. Kline and M. Stephens. (1957) *J. invest. Derm.*, **28**, 305.

Synthetic lecithin has many technical advantages over the natural substance and is reliable for serological purposes. J. H. T. D.

SPONTANEOUS MICROSPORUM AUDOUINI INFECTION IN A GUINEA-PIG. R. A. Vogel and A. M. Timpe. (1957) *J. invest. Derm.*, **28**, 311.

Bald patches are said to be fairly frequent in guinea-pigs supplied for the laboratory and it is usual to ignore them. But a techician had the curiosity to make a culture from this one. Stumps broken off at or below the surface were difficult to obtain and might well have escaped clinical detection. J. H .T. D.

ISOLATION OF MICROSPORUM AUDOUINI FROM A DOG. W. Kaplan and L. K. Georg. (1957) *J. invest. Derm.*, **28**, 313.

The 10-week-old boxer puppy caught it from the children. J. H. T. D.

TRANSFER OF ALLERGIC CONTACT-TYPE DELAYED SENSITIVITY IN MAN. W. L. Epstein and A. M. Kligman. (1957) *J. invest. Derm.*, **28**, 291.

This can be achieved if we use a sufficient number of lymphocytes derived from donors highly sensitive to the right kind of allergens.

In this experiment the recipients were negro males aged 20–45, the allergens 2,4-dinitrochlorobenzene, paranitrosodimethylaniline and pentadecylcatechol (one of the allergens in poison ivy). Patch tests were performed by evaporating 0·25 ml. of solvent containing a certain percentage of allergen in a cup 2·9 cm. in diameter. (While we are about it could we not have this expressed in microgrammes per square centimetre ?) Since by this technique high dilutions of both DNCB and NDMA are capable of sensitizing, the subjects were initially patch tested only with PDC, 1% dilutions of which can usually be trusted not to sensitize adults. The leucocytes used for the transfer were contained in fluid from bullae provoked by the allergen or from cantharidin bullae and, having been separated from blood, in saline. Material containing anything from 250,000 to 250,000,000 leucocytes was injected into several sites to an average total of 2 ml.

The sensitivity which is general, not local, takes a few days to develop and may disappear after a week or two, or it may reappear after a short latent period or it may gradually rise to a persistent peak level—according to the peculiarity of the individual recipient and irrespective of allergen or mode of transfer.

With PDC 17 out of 19 transfers (to 15 recipients) were successful; This happened also with cell-free blister fluid—which may of course have contained some product of damaged leucocytes. But the possibility of a recrudescence of some earlier allergic state has also to be considered.

With DNCB and NDMH, and then only when using at least 170 million cells, success was obtained in only 5 out of 18 transfers.

In a series of 6 children between 6 weeks and 2 years old there was only 1 successful transfer. Transfer to a subject with agammaglobulinaemia was achieved in one case but apart from this the general patterns of reaction suggest mechanisms qualitatively different from the more familiar events of bacterial allergy. J. H. T. D.

EFFECTS OF INTRAVENOUS ADMINISTRATION OF FAT EMULSIONS AND THEIR EMULSIFYING AGENTS. I. EFFECTS ON CLEARING FACTOR ACTIVITY, ELECTROPHORETIC PATTERN AND CLOTTING TIME OF BLOOD OF DOGS. W. F. Lever and B. Baskys. (1957) *J. invest. Derm.*, **28**, 317.

EFFECTS OF INTRAVENOUS ADMINISTRATION OF FAT EMULSIONS AND THEIR EMULSIFYING AGENTS. II. EFFECTS OF PHOSPHATIDE PREPARATIONS ON THE COAGULATION OF THE BLOOD OF DOGS. E. Klein, J. V. Garrett and W. F. Lever. (1957) *J. invest. Derm.*, **28**, 321.

The serum lipoproteins of dogs intravenously injected with soya-bean phosphatide are altered in regard to their electrophoretic properties. There is rapid clearance of lipaemia and the mechanisms of coagulation are impaired.

All these changes are reversed *in vivo* by protamine.

Addition of lyoptilized platelets *in vitro* neutralizes the heparin-like effect.

J. H. T. D.

THE BINDING OF CARCINOGENIC HYDROCARBONS TO EPIDERMAL PROTEIN. C. Carruthers, D. L. Woernley and J. Hittleman. (1957) *J. invest. Derm.*, **29**, 39.

The epidermis of mice, having been painted with various carcinogenic hydrocarbons, was broken down into various fractions by solution in alcohol urea and caustic soda followed by precipitation with hydrochloric acid. The extent of any combination was then assayed by measurement of fluorescence.

It would appear that a certain amount of fluorescence occurs in extracts of skin not exposed to hydrocarbons; and it is known that epidermal protein is also capable of binding non-carcinogenic hydrocarbons; but these experiments appear to show that the urea-soluble fractions have a greater affinity than the crude extract for methylcholanthrene and benzpyrene.

J. H. T. D.

LIPID STUDIES ON THE HUMAN SKIN SURFACES BY MEANS OF THE MONOMOLECULAR LAYER METHOD. I. FINDINGS OBTAINED IN THE SAME AND IN DIFFERENT SKIN AREAS IN IDENTICAL AND IN DIFFERENT HEALTHY SUBJECTS. L. C. Harben, F. Herrmann, K. Mandol and M. B. Sulzberger. (1957) *J. invest. Derm.*, **29**, 55.

If the area of piston-oil film displaced by a given quantity of epidermal lipoid tells us anything of its composition—as for example the fatty acid content—then there is a great variation in the grease to be found in different parts of the body or in the same parts of different individuals, in whom the pattern of distribution may also vary. But according to the findings here described the composition of lipoid from the same part of the same individual is pretty constant.

J. H. T. D.

THE ISOLATION IN CRYSTALLINE FORM OF SOME OF THE PIGMENTS OF TRICHOPHYTON RUBRUM. J. C. Wicton, P. J. O'Brien, L. Schmitt and A. Sohler. (1957) *J. invest. Derm.*, **29**, 47.

At least 3 distinct pigments may be isolated from colonies of *T. rubrum* by column chromatography of an ethylene dichloride extract of dried mycelium.

Among interesting by-products the authors discovered ergosterol in the hexane-soluble fraction.

J. H. T. D.

STUDIES IN LOCAL ACTION OF CORTICOSTEROIDS AT CELLULAR LEVEL IN THE SKIN OF MAN. VIII. PARTITION PAPER CHROMATOGRAPHY OF SKIN EXTRACTS. L. Goldman, R. Flatt, J. S. Mihina, J. Mier and E. G. Daskalakis. (1957) *J. invest. Derm.*, **29**, 1.

Paper chromatography will reveal and identify with some precision very small traces of steroid in biopsy samples ground up with sand and extracted with 95% alcohol. But the results, in 45 human and a few animal biopsies, amount to little more than a confirmation that steroids persist *in situ* for long periods after injection.

J. H. T. D.

STUDIES ON ITCHING. III. THE EFFECT OF TOPICAL HYDROCORTISONE ON PRURITUS. M. Robin and J. G. Kepecs. (1957) *J. invest. Derm.*, **29**, 91.

1% or 2½% hydrocortisone ointment was compared with the unmedicated base, care being taken to conceal from all taking part in the experiment the identity of the preparations used.

Hydrocortisone ointment has no effect on the complex sensations in normal skin elicited by stroking with cotton. Applied 2 hours before the production of a histamine wheal it fails to modify either the size of the wheal or the itching.

The "itching skin" phenomenon is not a constant accompaniment of the histamine wheal: it varies greatly from one subject to another, and it appears to be related to certain traits of the personality.

J. H. T. D.